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PROFESSOR M. E. SADLER, PRESIDENT OF THE CONGRESS.

AN INTERNATIONAL CONGRESS ON MORAL EDUCATION.

BY DR. J. GUNN, M.A.

THE first International Moral Education Congress has come and gone. As to its externals, the success of the gathering must have not only satisfied but to a considerable extent surprised even the most sanguine of its promoters, in these days when congresses are apt to be a glut on the market. To discuss the proceedings *seriatim* is now superfluous; the daily press, or at least such papers as have the capacity for dealing with matters of serious interest, devoted a fair amount of space to the four days' proceedings, and educationists may be assumed to be familiar therewith.

To a certain degree it must be admitted that these reports did not quite adequately represent what actually occurred. The papers were in almost every case taken as read, and the actual addresses of the speakers frequently varied much from the summary of the printed papers which was supplied. Again, many of the delegates, at some of the meetings perhaps a majority, spoke in French or in German, and not every newspaper reporter is qualified to summarize in English even a seven minutes' speech in either of these tongues. Add to these the fact that many speakers were called on whose names were not in the printed lists, and it will be plain that the variety and interest of the meetings were usually much in advance of the impression which even the best reports conveyed.

No better evidence is needed of the deep and sustained interest of the proceedings than the large numbers which occupied the hall of the University of London from day to day, morning and afternoon, despite the substantial charge for admission. Moreover, the type of audience, and the keen appreciation with which points were received, in whatever language made, were no less significant.

Not *what* the Congress was, however, but *that* it was, is perhaps the more significant fact. The fact that official delegates from fourteen foreign countries and some fifteen colonies, together with numerous representatives of educational institutions at home, met to consider the problems of moral education, is in itself a remarkable event in educational history. Whatever view one may take of the practical value of such a meeting, and however one may estimate its results, the mere fact that the whole civilised world is unanimous regarding the importance of moral education was here made abundantly plain, and the demonstration was singularly impressive.

The *personnel* of the Congress was worthy of the occasion. Never before, we may safely affirm, has there been assembled a gathering of educationists so widely representative in nationality, so distinguished as masters in their profession, and so varied in their outlook on education and on life. Extending, if not "from China to Peru," at least from Mexico to Japan in geographical distribution, and with a range of belief and aspiration no less extensive in variety, the gathering was such as only our cosmopolitan metropolis could hope to see assembled. And amid all this varied assemblage there were few indeed whom a thoughtful educationist could regard as a *quantité négligeable*.

There were faddists. No gathering of educationists would be quite representative if the faddists were excluded, for faddism is an undeniable fact in educational theory and practice. And nowhere was the wide catholicity of the gathering more clearly evinced than in the tolerance extended to the faddist. Or, to put it otherwise, this tolerance was the best possible proof that faddism was in the minority; for no one is more intolerant of fads—other people's fads, that is to say—than the man who is choke-full of fads of his own. But to regard the Congress as essentially or even to any considerable extent a gathering of faddists, is simply to miss the whole significance of a highly significant occurrence.

There were differences of opinion, irreconcilable differences. This was of the essence of the case, and was by no means a disadvantage. A congress of delegates unanimous on all points would be an unprofitable gathering. We are certainly a long way from unanimity as regards the problems of moral education, even in our own country; and when all the varied types of ideal and of practice throughout the civilised nations of the world are focussed on one platform, complete unanimity is the last thing which a thoughtful man would expect.

And yet there was unanimity. This also was of the essence of the case. A unanimous belief in the importance of education, and in the ethical result as being the highest thing in education, was the very *raison d'être* of the gathering. Whatever divergence existed as to the actual content of this ethical ideal and as to the best means to realise it in practice, as to its value to humanity and as to the efficacy of education as a complete process there was but one opinion.

One criticism regarding the composition of the Congress may fairly be made, and it is a criticism the force of which will appeal to many readers of this journal. It is this. The elementary school was not by any means adequately represented. Too many of the speakers were mainly concerned, or were at any rate mainly familiar, with other aspects of education. Administrative departments, universities, colleges, and secondary schools no doubt afford a supply of representatives who are more easily available for such a gathering, and who may be counted upon to adorn its debates with cultured eloquence. But it is not in these regions that

BRITISH MUSEUM

the most pressing problems of moral education are found. The circular issued by the committee begins: "The Congress has a severely practical object in view, that of improving the moral education offered in schools." Now, the word "schools" denotes institutions of which the vast majority may be described generally as "elementary." The question naturally occurs, therefore, whether the committee in charge of the Congress are of opinion that university professors are the best advisers as to how we may improve the moral education offered in schools mainly elementary. Many of those who are most familiar with the elementary school, and also with the university professor and others engaged in higher education, will hesitate to answer this question in the affirmative.

We do not mean to imply either that the moral education offered in the elementary school is inferior to that given in higher institutions, or that the pupils of the latter have less need of moral education than those of the former. We simply mean that the practical problems are largely different, and that those who know each type of school most intimately are best fitted to suggest what is or is not of the nature of an "improvement" in its work.

One could not but resent sometimes the assumption which seemed to be made, and occasionally made by those connected with elementary schools, that these schools stand on a lower moral plane than others. It is entirely false to regard difference of social and intellectual level as necessarily implying a corresponding difference in moral level. Differences in social conventions and etiquette are by no means essentially moral. The standard of dress and even of personal cleanliness may vary without an equivalent variation in ethical character. It is not uncommon to find a robustness of moral fibre, even to the point of puritanism, and an altruism not to be measured by the limited amount of possible generosity, prevalent among the humbler classes which afford the teacher the finest possible basis for character-building, and which are often sadly wanting among those with whom life flows in smoother channels. That the problems of education differ with the class of school is evident; but that the difference is always to be expressed in ethical terms is a grave error, and one too often made.

Controversy, if we may use the word to describe differences of opinion so courteously expressed, mainly centred round the two questions referred to in the last issue of this journal—namely, as to the relation between moral and religious education, and as to the value of "direct" moral teaching.

It was from France, always beautifully logical in its systems, that the best exposition of the purely "secular" theory of moral education naturally came, though English exponents were not wanting. And yet one could not but feel that there was something wrong with the logic. If we are to take the human mind or character at the highest level to which it has yet advanced through the course of the ages, and by our education strive to maintain and even to raise that level, are we logical in assuming that we can do so while ignoring one of the factors which has in the past been active in its evolution? If religion has been a factor in our reaching our present level, can we maintain and improve it without the influence of religion? To answer "Yes" without proof is to invite the reply "No," also without proof. Logic demands a proof, if our "secular" theory is to be really logical. But this demand has not been satisfied, and the logical flaw remains.

English secularists are less logical, and consequently still less convincing. For example, one of the speakers rested his case against religious teaching on the superior honesty of the "secular" teacher: many of those who teach the Bible do not "believe the Bible." The anachronism of speaking at the present day of "believing" or not "believing" the Bible was oddly out of place in a discussion which was in the main intelligent. Fifty years ago the phrase had a certain meaning. But to speak of a whole literature as if it were a logical proposition which might be true or false, and to reason from that view, is not likely to arouse respect for an educational theory which assumes to be at least up-to-date.

The speaking on this subject reached a very high level of interest and suggestiveness, and many of the speeches were admirable. Yet the debate was not to close without a variation which might be taken as either mildly humorous, or slightly rude, or simply irrelevant, according to the mood of the observer. A woman in the audience demanded of the chairman why *she* had not been called upon to speak, seeing that she represented some enormous number of Trade Unionist Congress delegates, who in turn represent a still more imposing number of members of various Trades Unions. The implication was obvious; but the chairman, the Rev. Dr. Gow of Westminster School, met the situation with courtesy and tact, and, possibly mindful of the parable of the importunate widow, made an opening for this highly representative person. Her message was brief, if not to the point, being a reminder that the recent Trades Union Congress had passed an almost unanimous vote in favour of secular education, and the speaker retired apparently happy in the belief that she had contributed something relevant to the discussion.

Regarding the other controversial matter—that of direct *versus* indirect moral instruction—space forbids the review of the discussion. A general impression was left on the listener that too many speakers assumed the two forms of treatment to be mutually exclusive. It seemed to be forgotten that the choice does not lie between the personal influence of the teacher and the influence of his direct teaching. The personal influence may be assumed to be active under either system, and the real question is as to the value of the teaching as an *addition* to this influence, not as an alternative to it. Another point not clearly recognised is that the kind of moral problem before a teacher depends upon the kind of school he has to conduct, and that the question is one which does not admit of a perfectly general solution. But the elucidation of these points cannot be undertaken within the limits of the present article.

Numerous other aspects of moral education were discussed in a more or less suggestive manner, the practical side not being always sufficiently prominent. Luckily for the teacher, the more substantial contributions are available in permanent form in the volume of *Papers on Moral Education*, edited by the able and indefatigable honorary general secretary of the Congress, Mr. Gustav Spiller; and this volume is exceedingly well worth careful study by all teachers, whatever their personal attitude towards the questions discussed. This book, together with the volumes edited by the president of the Congress, Professor Sadler, which were noticed in a previous issue, forms a valuable and permanent contribution to our modern educational literature, and will have an undoubted effect upon our educational thought, and eventually upon our educational practice.

The New English Movement.

THE PREPARATION FOR LITERATURE THE MOST IMPORTANT TASK OF THE PRIMARY SCHOOLS AT THE PRESENT TIME.

WHAT CAN BE DONE IN THE ELEMENTARY AND PREPARATORY SCHOOL TO LAY A FIRM FOUNDATION.

THE most important educational movement of the present day has for its object the removal of the well-deserved reproach that we endow our pupils with the power of reading and fail to show them how to use it worthily. Every progressive teacher is asking, What can be done to create a taste for good reading? The Board of Education, His Majesty's Inspectors, education officials, theoretical and practical educationists are all bent upon finding the answer or answers to this question. We are at present making an attempt to solve it in a practical manner as far as it concerns the primary and preparatory school.

In our July number Miss Clara E. Grant dealt with the Literature of the Infants' School, and in the August issue Mrs. Florence Kirk also wrote on the same subject. In September and October we published papers dealing with the Literature of the First Standard. In the present issue the Editor offers a paper dealing with the work in the class corresponding to the old Second Standard.

THE LITERATURE OF THE SECOND STANDARD.

BY "OBSERVER."

LAST month I ventured to protest against the use of the terrifying story for young children, and against the thoughtless assumption that all the "old favourites" among imaginative tales are good for the new generation. I have been both commended and condemned for my opinion, to which I still adhere, in spite of the reminder of one friend that our boys will grow up to sit on juries, while many of our girls will take up hospital nursing as a profession.

In my judgment it is the business of the school to brighten the lives of the children; and not only should all the stories used for class work in the early years end happily, but many of them should be specially chosen to give real amusement, to raise the laughter that "doeth good like a medicine," and to refine and train the sense of humour, which has more to do with real success and happiness in life than any quantity of heroics. Bring up a child to laugh at his own folly, and you arm him with a weapon with which he can cut many a Gordian knot.

We have neglected this side of human nature carefully and systematically. Up to within quite recent years the hearty laugh in the schoolroom was a thing unknown. This is not surprising, seeing that it might have cost the school managers an appreciable sum of money. So far as I can judge, the atmosphere has now been cleared to some degree, and in the best schools the "tone" is no longer one of "high tension." It is rather distinguished by a freshness and vivacity which has a wonderful effect on the pace at which real solid work is accomplished, and which causes many old-time "problems of discipline" to vanish altogether.

Now our business, as educators, is not to raise the "loud laugh that speaks the vacant mind." It is rather to show indirectly and without exhortation that there are certain things in life which are legitimate matter for mirth, and that many apparently great difficulties will disappear before a smile. I am aware that this atmosphere is difficult to create in schools where physical vitality is low, owing to poverty and semi-starvation, but something can be done even in schools of this class to lighten and brighten the labour of the day.

The chief instrument is the teacher's own demeanour. Gratiano was surely thinking of our noble profession when he said:—

> "There are a sort of men whose visages
> Do cream and mantle like a standing pond,
> And do a wilful stillness entertain,
> With purpose to be dressed in an opinion
> Of wisdom, gravity, profound conceit,
> As who should say, 'I am Sir Oracle,
> And when I ope my lips let no dog bark!'"

The most successful disciplinarians are those who dare to encourage a laugh. This is one of the tests of the suitability of a teacher for his work. Another powerful instrument is the use of the right sort of literature—the story which laughs gently at folly, the story poem of a playful nature, the amusing fable which sums up the wisdom of the ages.

There is a wealth of such lore in the fireside tales of various parts of the country, tales which have amused the simple rustics of bygone ages wnen the winter nights were long. Not all the material is suitable, for these same rustics were in a physical sense men and women; but many of their stories are very childlike in their directness of application and lack of subtlety, while others can be adapted and made quite suitable. Our "old favourite" *Red Riding Hood* itself is an example of adaptation from a tale by no means suitable for children.

Our school book purveyors have not yet drawn upon this store to any appreciable extent; but what of that? Let the teacher begin his literature work by carefully selecting tales of his own countryside, writing them down in simple language, and dictating them to his

pupils, to be kept for reading purposes. As educators, we are much too dependent upon the printed book. Here is an opportunity for laboratory work in literature. Why should we begin with the locality in history and geography, and not apply the same scientific method to literature?

Each of the stories employed ought to be examined by the children in such a manner that their power of judgment is trained and strengthened. Let me give an example of the use of this method, taken from *The Teaching of History in Germany* by Miss Eva Dodge, to which a *Practical Teacher* reviewer made reference last month. The class under observation had been reading the heroic legend of Siegfried, of which national use is made in Germany. Miss Dodge goes on:—

"The teacher began by revising the story of Siegfried's death. The children re-related it in sections. He was particular as to how they did it; they must make the 'hang' of the story clear first by the use of headings.

"'We ought to get a general view first for a narration,' said he; 'get the chief points and the most important. Then we have a thread right through which we can follow.'

"Then he told them the rest of the story, recommending them, 'Say it to yourselves again this afternoon.'

"Afterwards came an animated discussion of the tale.

"'So we have come to the end of this story. What has pleased or displeased you in it?'

"(Suggestions in plenty after this fashion.)

"'It did not please me that Kriemhild betrayed her secret.'

"'It did not please me that Gunther agreed to Siegfried's murder.'

"'It did not please me that Hagen should kill Siegfried.'

"'It did not please me that Hagen was so crafty.'

"'Yes. If he had met Siegfried openly in fair fight, that would have been right; would it not? Does nothing please you in Hagen? *Why* did he do the deed?'

"'He had to obey the king.'

"'Had to? Anyhow he did so. That is a good quality of the old Germans—their faithfulness. They stuck to their lord through thick and thin, and did his bidding, too, as we see, even when it was something bad!'

"'Was Siegfried blameless?'

"'No. He should not have fought Brunhild for Gunther.'

"'That was deceit.'

"'Was Kriemhild blameless?'

"'No. She should not have betrayed the secret.'

"'Does nothing please you in Kriemhild. It seems as though you only wanted to throw stones at her!'

"'Yes—that Kriemhild loved her husband so very dearly.'

There is a fine strengthening power in this kind of work, a training in discrimination, an emphasising of the deep spiritual lesson that in life we must be definite in judgment and yet ready to make allowance and to think the best. In some such manner should every story worthy of being enclosed within the pages of a school book be used. But in our schools we have not yet even *begun* to work on this plan.

Think what it means in the mental training of the young reader? The effect of consistently using such a method will be to cause the pupil to form a habit of thinking carefully about any story he may read out of school; to check the present feverish reading of fiction, which is as yet the only effect of the cheapening of good books; and to create unconsciously a standard of right living of a worthy character. Even in a Second Standard of a primary school we can be working for such lofty aims, and forming habits of mental and moral vigour.

Besides the imaginative literature employed for reading and study in this standard, a beginning might be made with that reading for information to which I made some slight reference last month. The child ought to learn that it is possible to get from books a great deal of interesting and suggestive information; but it is not easy to find the right kind of literature for this purpose. Books which tell of an encyclopædic uncle and abnormally inquiring nephews soon disgust the child, as they ought to do; for he cannot work up any human interest, and would much prefer to have the information given in a straightforward manner. One wishes that some writer of repute would do for our children what Carl Ewald did for the little ones of Denmark—that is, humanise some of the wonders of the natural world in a manner which charms while it instructs. Here and there one meets, even in English books, with Nature stories of the right kind, but they are few and far between.

The reading and telling of stories begun in the infants' school ought to be continued in this standard. Suitable material will be found in Hans Andersen, Carl Ewald, and Grimm, rather longer tales being chosen and doled out in portions. A simplified *Robinson Crusoe*, or *Gulliver's Travels*, or a volume of "Uncle Remus" tales is suitable for this stage. Other material will be found in Messrs. Jack's "Told to the Children" and "Shown to the Children" Series; in Messrs. Nelson's "Golden River" Series; and in Stead's "Books for the Bairns." Pupils might be encouraged to buy the easier volumes from the last-named and other similar series with their spare pennies, the teacher naming the volume which he has examined and found suitable, and occasionally giving one as a prize. In this way a great deal can be done to put the young reader on the right track, as well as to help the school work and raise the general level of intelligence. Fortunately the penny series of the railway bookstall are now for the most part made up of worthy material, and form a pleasant contrast to much of the popular literature (save the mark) at a higher figure.

AN INTERESTING PRIZE COMPETITION FOR ACTING TEACHERS.

A PRIZE of ONE GUINEA is offered to teachers for the best method of dealing with an imaginative or historical story on the lines laid down in the first column of this page. Competitors may choose any well-known story, and must show how it can be used to exercise and strengthen the judgment of young pupils. Preference will be given to those competitors who send in an account of an actual experiment in the classroom. The winning article will be printed in the *Practical Teacher*, with portrait of the winner, if no objection is offered. This competition is open until December 6, to allow time for experiment. Competitors must give name, status (head or assistant), and school, and enclose coupon from the present number of the *Practical Teacher*.

SUGGESTIONS FROM AMERICAN SCHOOLS.

BY W. H. WINCH, M.A.

(*Continued from page 173.*)

PERHAPS to-day it may be worth while to consider another aspect of the attitude of American schools toward English. So far, I have dealt with methods of teaching reading, and have indicated in broad outlines, as well as in definite instances, how the children read and what they read. I have tried to show that the American is keen that literature shall be heard and read in his schools—mere printed matter will not suffice for him. I looked in vain in the slums of New York, Boston, and Chicago for papers corresponding to those which in the newspaper shops of our own slums, often with gaudy colouring, exaggerated drawings, and intentionally debased English, are exposed for sale—and bought, too, by our "Board School" population; bought by poor boys who, if they buy papers, will get no sweets, and who can get good books from their school libraries for nothing. Perhaps there are obscure economic reasons unknown to me, such as the cost of paper or of labour, which prevent the supply of such an article in the United States at a sufficiently low price. It may be that there would be found to be a big demand, as at home. I can only say I saw little evidence of it. I found, indeed, one boy in a prison school near Chicago reading *The Iron Pirate;* but the Iron Pirate—if it is the one I used to know—was a dignified gentleman compared with the tricky and indolent wastrels whose adventures seem so entrancing to our boys in London.

But hitherto I have dealt, perhaps, more with what the teacher does than with what the children do, and in so doing I have been flying in the face of an American ideal. Let us listen for a moment to the instructions of the Local Educational Authority of New York to its kindergarten teachers.

A negro boy in Chicago, when asked by me if he had ever attended a kindergarten, thought for a moment, and then said, "Oh yes—where you jump about, and sit around, and play." That is not New York's idea. Her instructions to kindergarten teachers run thus:—

"In order to co-ordinate the kindergarten and the primary grades, the kindergarten exercises should be modified toward the close of the term, in preparation for promotion. There should be periods of silent work and a greater proportion of independent work."

In recent reports to the Bureau of Education at Washington, actual data as to the exact course of real and unprepared lessons, with incidental specimens of the children's ordinary work, have been asked for and supplied. Everywhere among educationists the questions are persistently being asked: What can the children do for themselves? How does this apparently highly reasonable method—from an adult's point of view—affect the children? What do *they* do? What do they delight in doing? What will they do when they grow up?

Apparently the American boy deteriorates somewhat in his literary tastes, for his adult newspapers are often scrappy, violent, and given to "scare" headlines. We are progressing downwards with our newspapers too, but have not yet got so far down. So perhaps the balance is not wholly on the American side. However, having already considered what is placed before the American child as English literature, to be listened to, read, and loved, we have to-day to ask how the American child is led and taught to produce English for himself.

I do not think the kindergarten will detain us long—even the New York kindergarten, with its "independent study" (I did not see any). The verses which children learn in kindergartens—if the English is good—are doubtless of value. And valuable, too, it is if the children are led to express themselves in good language about something; not, as is too often the case, *à propos de bottes*. But what I saw in American kindergartens was rather that sort of sensory and manipulative work some of which, among other things, has been recommended by the recent report of the Consultative Committee of the Board of Education for the training of children under five years of age.

We pass on to the graded classes. The American grades are supposed to begin at six years of age, and not, like our standards, at six and a half. The headings under which the English work is grouped differ in different parts of the country. In our phraseology the English work of Standard I. comprises reading, spelling, composition, literature, and perhaps writing, though I, personally, should class writing with manual work. The New York syllabus divides the English work of Grade I. into "composition, penmanship, reading, memorising." The Chicago syllabus divides it into "language, word study, reading, literature." And there are other variations; but a close scrutiny discovers that they all mean much the same thing. I will quote the language (we should say composition) work for the Chicago Grade I.:—

"In first grade this should be oral, and should consist of: telling experiences and observations; retelling stories; dramatising stories, poems, and pictures; reciting in all subjects. In general the recitations of the children should be in complete sentences."

Two possible misunderstandings must be guarded against. Firstly, "recitation" does not mean repeating prose and poetry; it means answering questions on work which the children have been taught or have done for themselves. And secondly, the work of Grade I. in America corresponds rather to that of our infants' "sixes" class (London Grade III.) than to that of Standard I.

Probably there are few infants' schools in England now in which work of this kind is not done. The American may, however, fairly claim that we have followed rather than led. He has followed too, for the German object lessons (*Anschauungs Unterricht*) are really lessons in *correct speaking* about pictures and objects. The teacher asks a question, a pupil answers it; the teacher asks another, another pupil answers—and so on. Then another pupil puts these answers together in a continuous form, and the process is repeated, until each child is supposed to be able to give a continuous description. Personally, I should not proceed in this way for all purposes of composition; but it is a good method for leading children to make connected accounts of what they see, and has been in vogue in Germany for several decades.

The Chicago teacher is finally cautioned to use "drills" to secure distinctness and clear enunciation. I am wondering how far it would be practicable in England or America to teach the proper formation and enunciation of all our distinguishable literal sounds, and whether it would be worth doing. But for the present I must leave that.

Let me get back to oral composition. We have read some of the instructions; now let us see what is actually done. I take my first illustration from a city in Wisconsin.

MILWAUKEE, WISCONSIN, ELEMENTARY SCHOOL (MIXED).

Grade II. Forty-seven children were present, with an average age of eight and a half years.

These children, I was told, were well practised in oral composition; so I asked them to tell me a story about a dog, a little boy, and a little girl. Most of them were eager to try, and I selected one, who told the following story:—

"Once there was a little boy and girl who had a little dog. As they were going along, a cab ran into a telegraph post. The boy and the girl ran up, and the dog ran up, and the horse fell down."

A second child told the following story:—

"Once there was a boy and girl walking along the street, and they saw a little puppy, and he was lost, and they washed him and fed him, and he grew up and loved them, and grew old and died."

It was obvious from these little tales and from the general readiness of the children that this subject was well within their range; so I asked for a story about a ship, a sailor, and a storm. No one seemed anxious to try this; so, after giving an interval for reflection, I gave the subject again—a soldier, a ship, and a storm. A little girl stood up in the middle of the class and remarked in a loud voice not untinged with a sense of injustice, "You said *sailor*." I called her to me, praised her for noticing my mistake, and asked, "Can you tell the story?" "Sure," she said, with great confidence, and after a while began:—

"Once there was a sailor, and he was walking the street."

But we could get no more from her. There were some more abortive attempts. Very pluckily the little ones trotted out in front of the class, faced round to the other children, put their hands behind them, and began. But they did not finish. The most connected story was the following:—

"Once there was a sailor, and he got in the ship to ride to his home. He got to the shore and went home. He ate his dinner and saw a storm."

Doubtless he saw the storm more comfortably than if it had broken out while he was on the ship, but what an opportunity was missed for glowing description!

However, the teacher said, and I heartily agreed, that, since these things were beyond the children's experience, only a literary knowledge would enable them to tell that story. But I could not help reflecting, as I went home, that Milwaukee was on the shore of the great Lake Michigan.

(To be continued.)

THE EDUCATIONAL POST-CARD.

THOSE of our readers who make use of the picture post-card in school work will be interested in a new departure of Messrs. Misch and Co. of Cripplegate Street, London, E.C. This firm has just issued four series of educational post-cards, entitled—(1) The "World's Galleries" series, facsimile reproductions in colour from the great galleries; (2) the "Floral" series, studies of flowers for students of botany; (3) the "Touro Graphs" series, views of foreign towns carefully selected; and (4) the "Scripture" series, depicting events in Holy Writ. Teachers interested are invited by the publishers to send for lists of subjects.

APOLOGY.

IN the article on "Training for Citizenship" in last month's issue an unfinished sentence occurring in the second column should read: "Mrs. Green in her *Town Life in the Fifteenth Century* illustrates conditions which might well receive more notice than they do in our school histories, and some simple stories which would tend to a better comprehension of present conditions of town life could well be taken thence."

THE DRAMATIC INSTINCT IN CHILDREN.

HOW TO MAKE USE OF IT IN SCHOOL WORK.

BY RUBY K. POLKINGHORNE, B.A., STOCKWELL SECONDARY SCHOOL.

"IN the child's world of dim sensation, play is all in all. 'Making-believe' is the gist of his whole life, and he cannot so much as take a walk except in character."

Nothing pleases children more when they have been told a story than to be allowed to act it over again, each taking it in turn to represent his or her favourite character; or to have the teacher retell the story, the children performing the necessary actions. It need hardly be said that words and actions should be voluntary on the children's part. There is nothing to be gained by forcing children to act, and it must be remembered that there are always stories which do not appeal sufficiently to them to make them greatly wish to dramatise them.

If, however, we wish children to remember the doings of the old heroes and heroines of the world, there is no better way than by encouraging them to repeat those heroes' speeches—translated, it may be, into their own childish language—act those heroes' parts, and be for a time dwellers in those far-off days. This the average child enjoys, especially if we do not wish him to repeat our words, but leave him perfectly free to interpret the story in his own way.

A form I had of twenty-seven children enjoyed acting "Balder's Death," and below I give the words they used and the way they did it, in case any should care to imitate or to allow other worthy stories to be acted in a similar way.

The children printed a large notice, "Balder's Death," and pinned it up in front of the class. It pleased them to have the title of their play thus conspicuously displayed. Then one child was chosen to be what they called the "story-teller." Her business was chiefly to put in descriptive bits and explanations that the children thought unsuitable for the various actors to have to say. When the parts had been satisfactorily arranged the play began in this manner:—

Story-teller. It was noontide in the land of the gods and goddesses. The sun was hot, and a sleepy stillness pervaded the whole air. In his palace, Balder the Bright, beloved of all, slept. (Points to Balder, who sits on floor in front of class with head resting on chair.) Odin too slept on his great Air Throne (points to Odin at back of room); and Thor, Balder's brother, was walking low down in a shady valley. (Points to Thor.) Now, as Balder slept, he dreamed, and his dream was troubled (Balder moves restlessly)—so troubled that he awoke, and clasping his hands over his heavy heart, went to seek his mother. (Balder awakes, and walks sadly to chair where Frigga is sitting, and kneels at her feet.)

Frigga. What is the matter, dear Balder?

Balder. I do not know, my mother, I do not know, but I have a shadow in my heart.

Frigga. Take it out, my son, and let me look at it.

Balder. I dare not, my mother, lest this shadow should fall over the whole earth.

Story-teller. Then Frigga bent down and put her hands over her son's heart to feel the shadow, and started back.

Frigga (very sadly). O my son, this shadow is the shadow of death.

Balder (springing up and throwing back his head). Never mind, then, my mother; I will die bravely.

Frigga (rising). You shall not die at all, for before sunset I will get everything to swear not to injure you.

Story-teller. Then Frigga went to the top of a high hill, and called everything to her that could harm Balder. (Frigga stands on chair.) First she called all the rocks; and great stones came lumbering up the hill—huge pieces of granite, boulders from the seashore, small rocks, and crumbling sandstone. (Five or six children rise from their places and stamp towards Frigga.)

Frigga (raising her right hand). Swear to me that you will not injure Balder.

Stones (gruffly and solemnly). We swear. (Stamp back to places.)

Story-teller. Then she called to her all the trees; and they came waving their branches decked with leaves, whistling and murmuring—the melancholy pine, tall poplars, bright lime, dark cypress, sad yew, sturdy elm, and drooping willow—every tree. (Five or six children walk up to Frigga, whistling and waving their hands.)

Frigga. Swear to me that you will not injure Balder.

Trees (murmuring as much like trees as possible). We swear. (They depart, whistling softly.)

Story-teller. Then Frigga called to her all the diseases; and they came, sighing and groaning, borne on the wings of pain.

Frigga. Swear to me that you will not injure Balder.

Diseases (groaning). We swear. (Depart sighing. If the children wish, the metals, flying insects, creeping things, etc., can come on in turn and swear not to injure Balder, for this part of the story is generally enjoyed greatly by the form.)

Story-teller. When Frigga had got an oath from everything that could injure Balder, she went back to her sunlight palace and told Odin all about it.

Odin. And is the shadow gone from my son's heart?

Frigga (impatiently). Of course it is. Has not everything sworn not to harm him?

Story-teller. But Odin looked at Balder and saw how it was—the cloud on the beautiful brow and the happy eyes dim; so he saddled his eight-footed steed, Sleipnir, and rode to a dead Vala, who, when she was alive, knew everything. Her grave was very near Helheim. (Points to grave—that is, to where a child lies on floor to represent the dead Vala. Odin acts as story-teller describes.)

Odin (approaching and kneeling by dead Vala, speaking solemnly).

Awake, awake, dead mother!
Thy wisdom I now need.
Awake, awake, dead mother!
My ring shall be thy meed.
Awake, awake, dead mother!
These runes thou well must heed.
Awake, awake, dead mother!

Vala (sitting up suddenly). Who calls me? What do you want?

Odin. I see from here into Helheim (shading his eyes and looking into the distance). For whom is Hela preparing that couch of death?

THE VALKYRIES MOURNING FOR THE DEATH OF BALDER.—(JESSIE MACGREGOR.)

Vala (crossly). For Balder, of course, the well-beloved. Now go away, do. I am so sleepy.

Odin (sadly). And must Balder die?

Vala. I have told you, yes. Now go away. Rain, frost, and hail have never wakened me, nought except you, and I must sleep for a hundred years.

Odin. Just one more question. Will Balder never return?

Vala. Yes; if everything on earth should weep for him. Now go away. I am so sleepy. Go, go, go! (Falls back.)

Story-teller. Then Odin rode thoughtfully homewards, and when he reached the palace of Broadblink he found all the gods and goddesses engaged in a merry game. They were throwing things at Balder the Young, because they knew they could not injure him; for had not everything sworn not to harm him except the mistletoe, which Frigga thought too young and weak to take an oath? But Loki, the Schemer of Evil, the Jealous One, was walking about with an arrow made of this very same mistletoe in his hand. (Children act as story-teller describes.)

Loki (to blind god Hoder). Come, friend, come, join in the sport. I will show you the way.

Hoder. I cannot see, but I would join in this merry game with Balder the Beloved, to do him honour.

Loki. Come, then, this way (leading him up to Balder). Now, throw with all your force to do him honour (impressively). (Hoder throws the arrow, and Balder falls down dead. All gather around him, weeping.)

Story-teller. Then Odin told all the gods and goddesses of his visit to the dead Vala, and how she had said that Balder would return if everything wept for him. When they heard this, they were more comforted, and carried off the body of Balder for burial, weeping quietly. (All children go back to places except Odin.) Now Odin called to him six messenger maidens with strong wings, and bade them go about the world, saying, "Weep, for Balder is dead." (Six girls come out to Odin, and then walk about among the desks, saying, very softly, so as not to interrupt the story-teller, "Weep, for Balder is dead.") And everything that heard that cry wept—the mountains, the cold metals, the trees, flowers, and grass in the fields, children on their way to school, labourers digging the ground, mothers rocking their babies to rest—all wept for Balder the Bright, the Bold, the Beautiful, and Young. Then, when the messenger maidens had finished, they came to a deep ravine, on the borders of which they found a horrible old witch with two heads. (Points to witch.)

Messenger Maidens (going up to her). Weep, for Balder is dead.

Witch (scornfully)—

What care I though the world weep for Balder's death?
My eye shall ever tearless be for Balder bold,
In spite of Odin's wish and all your woe.
Let Hela keep in her dark pit what she does hold.

Story-teller. And with a horrible cry the old witch disappeared. Then the messenger maidens, having accomplished their task, went to Hela and asked for Balder.

Hela (sternly). One has not wept, and Hela keeps her own.

Story-teller. So the messenger maidens fled weeping back to Odin with their sad news, and sorrow remains over the whole world—the shadow of Balder's death—until the twilight of the gods.

The same child need not be the story-teller all the way through. It is interesting to notice how orderly and quietly the children manage the necessary goings up and down involved in this play when they know they are left to themselves and the teacher is only a looker-on. The value of these acted stories is, I think, easily seen. Not only do the children remember the events well, but expressive and fine-sounding phrases and sentences from the teacher's version of the story or from their reader, and this will be found to help their written composition. They thus become critical over words, and recognise their different values to some extent. The best argument, however, in favour of acting stories seems to me this—that the children enjoy it, and find scope for their energies.

SPECIAL NOTICE.

TEACHERS who wish to encourage pupils to read at home should write to Messrs. Nelson for a specimen copy of Part I. of a new serial work entitled

"BRITAIN OVERSEAS."

PRONUNCIATION OF SELECTED CLASSICAL AND MEDIÆVAL NAMES.

BY E. P. DOUGHTY, M.A.

(*Continued from page 176.*)

Hăl′-cў-ŏ-nē. Here the influence of the word *halcyon* will make us pronounce *c* as *s*.

Hăl″-ĭ-ăc′-mōn.

Hă-mă′-drў-ă-dēs, less accurately Hăm″-ă-drў′-ă-dēs; compare Dryades.

Hăr-pyī′-ae (English Harpies), three syllables; pronounce *-pyi-* (Greek *pui*) as *puў*.

Hēc′-ă-tē.

Hēl′-ĭ-cōn.

Hē′-lĭ-ōs.

Hēl′-lēn (that is, a Greek), plural Hēl-lēn′-ēs.

Hē-phaes′-tŭs, *he feast us;* the Greek form is Hē-phais′-tōs.

Hē′-rā.

Hĕr′-mĭ-ŏ-nē, not Her-mī′-ŏ-nē or Her-mi-ō′-nē.

The reader should carefully notice the words in which there is only one stress (unless the stress on the last syllable is counted), and that on the fourth syllable from the end.

Hēs-pĕr′-ĭ-dēs, plural word; *peri = perry.*

Hĭp′-pŏ-dă-mī′-ă.

Hĭp-pŏm′-ĕ-nēs.

Hў′-ă-dēs, plural word: *hy-* as in *hymn;* incorrectly pronounced *higher dees.*

Hўp″-ĕr-bōr′-ĕ-ĭ: *-bor-* as in *borrow. Hўp- = hip,* often made to rhyme with *wipe;* so in Hўp″-ĕ-rī′-ōn.

Hўp-sĭp′-ў-lē.

Ī′-că-rŭs.

Ī′-lĭ-ăm (Greek Ī′-lĭ-ŏn).

Ī″-ŏ-lā′-ŭs: -aus, two syllables, represents the Greek āōs. *Io-* more correctly as in *vitriol;* often as in *violin.*

Ĭph″-ĭ-gĕn-ī′-ă; *g* usually = *j* in this word. *Iph-* may be pronounced *Ĭph*, rhyming with *wife*, or *Ĭph*, rhyming with *whiff.*

Ĭt′-ўs.

Ixion, as Ĭk-sī′-ōn.

Lā-ĕr′-tēs.

Lā-ŏc′-ŏ-ōn; for *-oon* compare Demophoon.

Lā″-ŏ-dă-mī′-ă.

Lā-ŏm′-ĕ-dōn.

Leu-cŏth′-ĕ-ă.

Lĭn′-ŭs.

Lўc″-ŏ-mē′-dēs: *Lyc- = lick.*

Lўn′-ceus, *link-use* (noun).

Mē-dē′-ă.

Mĕg′-ă-ră.

Mĕl″-ĕ-ă′-gĕr, so usually pronounced; more accurately Mĕl′-ĕ-ă-gĕr.

Mĕn″-ĕ-lā′-ŭs.

Mĕr′-ŏ-pē; *Mer-* as in *merry.*

Mī′-dās, so usually; more accurately Mĭd′-ăs.

Mī′-nŏs, so usually; more accurately Mĭ′-nōs.

Mĭn′-ў-ae, *Minnie E.*

Mў-cē′-nae, usually like *my sea knee.*

Mўr-mĭd′-ŏ-nēs (English Mўr′-mĭ-dŏns): *Myr- = myrrh.*

Mў′-sĭ-ă or Mўs′-ĭ-ă.

Nā′-ĭ-ă-dēs, plural word; note the stress.

Nau-sĭc′-ă-ă.

Nē′-leus; *eu* diphthong.

Nĕm′-ē-ă; the adjective, however, is usually pronounced Nē-mē′-ăn.

(*To be continued.*)

NOTES ON READING IN THE UPPER CLASSES OF PUBLIC ELEMENTARY SCHOOLS.

(*Continued from page 175.*)

NOTES ON METHODS.

SOME suggestions on methods of treatment are appended.

1. The keynote of what is written before is *discrimination*. Just as we may discriminate between books, one being used for personal reading, another for study, and so on, so it is well to discriminate between passages of the same book, especially the one designated the "manual." Not all passages in such a book will lend themselves to effective reading aloud, though they may amply repay study. So also even the same passage may be treated from different points of view; a poem in particular is susceptible of great variety of treatment.

2. A further discrimination may be suggested in dealing with books of type A—that is, to choose certain pieces for a kind of intensive study, in which the full meaning may be exhausted, on which exercises in composition and grammar may be founded, and which in some cases may be learnt by heart. This method of attacking the native tongue has received little attention in England, but it is believed that it would be very fruitful in results. Other passages may be more lightly passed over.

3. The proper place of reading aloud should be considered. It is plainly inappropriate when dealing with books of type C; they will not be written to be read aloud, and it is a safe rule never to have read aloud any passage that does not, in an æsthetic sense, deserve the honour. Reading aloud will be in place in books of type A, and from time to time a scholar may be usefully asked to select a passage from the story he is reading (B) to read aloud, whether the rest of the class have the book or not. The teacher would at first give some guidance as to the sort of passage which ought to be selected.

4. Apart from this occasional variation, books of type B are clearly to be read alone and not as a class exercise. The teacher cannot preserve a very close supervision over the reading. The scholars must learn to solve the difficulties they find by using a dictionary, referring to the teacher, or, as the child privately brought up does, *by reading past them and trusting to a wider acquaintance with the language to bring completer understanding.**

5. In connection with books of types B and C the questions of systematic reading and of the use of public free libraries arise. If the scholars can be induced to read at home, or if a large amount of time is available in school, reading on the plan of the National Home Reading Union may be adopted. The central idea here is to group one's reading for a period round a single subject—historical, geographical, literary, or scientific. This is not always feasible in an elementary school; but an example would be if a class of children of thirteen, say, with access to a free library, or a good school library, or with a selection of different books on the Birkenhead plan, should devote its year to the study of Dickens, and read three or four novels of Dickens themselves, obtaining illustrative material from books of reference, from the teacher, or from home. In any case, teachers should know what is in the local library and act accordingly.

6. Care should be taken lest the study of books of type C becomes a mere memorising of facts. To this end it is well to set definite but varying tasks; to hunt out facts, to collect and arrange facts from various parts of the book, to summarise portions of the book, to find out answers to questions—if possible, questions started by the scholars themselves—from the book—in short, to learn how to use a book as a tool.

7. The spirit of "research," if so great a name may be applied to the tasks alluded to in the last paragraph, need not be confined to the treatment of books of the C type. In the same way, it is possible to train children to compare different characters and scenes in one of their continuous books, and similar characters or scenes in different stories. The habit of research among books is as useful as the habit of research among the pages of a single volume.

8. The proper use of dictionaries should receive careful attention. It is not enough to place them in the hands of children without guidance. The children need to be taught how to find their way about a dictionary, how to follow up the meanings of a word when the first attempt yields no useful result, how to make the most of what the dictionary can give, and when to desert the dictionary and apply to the teacher. The search for meanings can be made a valuable and interesting piece of work, and if the search arises naturally out of a genuine difficulty that has arisen in a lesson it is all the more pointed. Pedantry in this, as in other exercises connected with reading, should, of course, be avoided.

* The Editor has taken the liberty of emphasising these words, as they appear to him to be not only of great importance but highly necessary at the present time. The older methods of teaching the use of a reading book, not yet quite extinct, prohibited the child from using the road until he had carefully examined every stone!

THE CREED OF THE VIKINGS.

SOME EXPLANATORY NOTES ON ICELANDIC MYTHOLOGY.

BY INGEBORG LUND.

A WRITER in the July number of this journal suggests "plenty of stories, a wealth of fairy lore, simple accounts of brave men and deeds," as the best preparation, in the infants' school, for the study of literature later on. With all this the present writer most cordially agrees. There is nothing most children love so much as listening to stories; and if they are well told, teachers will always find willing listeners. But as this method is to be considered a "preparation" for literature, it would perhaps be as well to think of what is to be done for children whose imagination has been awakened in this way. Fairy stories and tales of legendary heroes are very attractive, but they will soon lose their hold on children's minds—especially on those of the matter-of-fact, practical children of the present day—if they seem to have no connection with their own lives. Unless they can be shown to contain some truth of present value and personal interest, they will soon be looked upon as "childish," as food for babes, and beneath the dignity of grown-up people of twelve or fourteen. But fairy tales and stories of heroes should be a preparation for the study of that from which they have grown—mythology; and if this is taught in the right way, so that the children become interested in it,

they will in time find that there is more than a mere fairy tale in the story of Perseus and the Gorgon, when experience has shown them that courage and perseverance can overcome difficulties which at first appear to be beyond human strength. The literature of mythology and its offspring, fairy lore, abound with examples capable of such interpretations; but they have been drawn chiefly from Greek legends, and it might not be out of the way to draw attention to some taken from Norse or Icelandic mythology. They are not very widely known as yet, although it would seem that they are more in sympathy with our own view of life.

It is generally agreed that the religious ideal of the Vikings was one that inspired its votaries to a life of warfare and plunder, with the hope of very materialistic joys in the life hereafter as a reward for a glorious death on the battlefield. Unlike the Greek religion, it has not left behind it any evidence of its inspiring power in great art. This is rather to be found in national characteristics—in the energy and perseverance, the courage and tenacity of purpose, that characterised the Vikings, and which can still be traced in their descendants, not least in those who settled in England. Teutonic and Icelandic legends have, however, appealed to the imagination of modern poets, and many who perhaps knew little or nothing of the religion of their forefathers have had their interest in it awakened by the music dramas of Wagner and the poetry of William Morris.

All that is known of old Norse and Icelandic beliefs is derived from the fragmentary collection of poems called *The Elder Edda*, gathered together in the eleventh century by a Christian priest of the name of Saemund. Fragmentary as they are, they give a picture of the Norse Olympus from which it may be seen that, if the religion of the Vikings lacks the outward grace and charm reflected in Greek poetry and art, it has perhaps more spirituality, more searching depth of thought. Certainly one cannot read the Eddic poems without feeling that their writers, who doubtless interpreted the thought of their time, believed that life was meant to consist in more than warfare and plunder, and that the Valhalla for which they hoped was meant for those who would die rather than yield in any struggle to attain their ideals.

In his well-known work, *The Home of the Eddic Poems*, the late Professor Sophus Bugge of Christiania agrees with the results arrived at in earlier works of research, and has endeavoured to prove that many of these poems were written under the influence of Christian surroundings, and that they cannot therefore be relied upon as giving a true picture of Viking belief; but it must be remembered that at the time when these myths first took definite form they were regarded as the expression of belief in Odin and all the gods of Asgaard, the Norse Olympus. Nor is there much in these poems, said to be of Western origin, except in some outward features, to support this theory of Christian influence. The spirit and essence of the Eddic poems is pagan, and it is from this standpoint that they must be considered, since, of course, if all their merit is to be ascribed to the influence of Christian thought, they lose the value which might be claimed for them as an independent, pagan outlook on life.

Amongst those figures in the *Edda* which it might safely be concluded would attract the imagination of children, the majestic personality of Odin, as chief among the Aser, the gods of Asgaard, should be mentioned first. He is imagined as ruling over heaven and earth from his throne Lidskialf, the Seat of Listening, in his great hall, Valaskialf. His ravens, Hugin and Munin, are perched on his shoulder, and every day bring him tidings of all that has come to pass in the world. Odin pledged one of his eyes to Mimer, who guards a well that waters Yggdrasil, the tree of life. His swift horse Sleipnir has eight legs, and can carry him both over land and sea; and his spear, Gungnir, pierces through the strongest armour. The art of writing owes its origin to Odin, who invented runes. They were engraved on the point of his spear and on the teeth of his horse. Odin had also a wonderful ring called Draupnir, which had the magic quality of

ODIN.—(E. BURNE JONES.)

forming every ninth night eight new rings as large as itself. The god laid it on the funeral pyre of his son Balder, who sent it back to him from the kingdom of the dead as a token of remembrance. Odin is never at rest; he is the tireless wanderer, going in search of knowledge to the fates who watch over another well that waters the roots of Yggdrasil. He wanders in many disguises amongst men, and in one of the sagas he is described as giving sage counsels to a king, according to the duties belonging to the office of a king's wise man or counsellor. Some of these sayings apply to the life of our own times, as though they had been written yesterday. The following are a few instances:—

"He that never is silent talks much folly. A glib tongue, unless it be bridled, will often talk a man into trouble."

"It is a far way to an ill friend, even though he live

on one's road; but to a good friend there is a short cut, even though he live far off."

"One's own house is the best, though it be but a cottage. A man is a man in his own house. Though thou hast but two goats and a hut of hurdles, yet that is better than begging."

"To one man's house I came much too early, to another's much too late; either the ale was drunk out or it was unbrewed. An unwelcome guest always misses the feast."

"Once I was young and travelled alone; then I went astray. I felt happy when I met a man. Man is man's comfort."

"Open-handed, bold-hearted men live most happily; they never feel care; but a fool troubles himself about everything. The niggard pines for gifts."

"A fool is awake all night worrying about everything. When the morning comes he is worn out, and all his troubles are just as before."

"Chattels die, kinsmen pass away, one dies oneself, but good report never dies from the man that gained it."

"No man is so good but there is a flaw in him, nor so bad as to be good for nothing."

"Anything is better than to be false. He is no friend who only speaks to please."

"Go on; be not a guest ever in the same house. Welcome becomes wearisome if he sit too long at another's table."

(*To be continued.*)

THE EARLY SHADOWS.—FIRST PRIZE, PHOTOGRAPHIC COMPETITION.
By Mr. G. A. Godrich, Belper Street Council School, Leicester.

A MATTER OF DISCIPLINE.

A RECENT number of *St. Nicholas* * contained an entertaining and suggestive illustrated article on "Boy Policemen," which is full of interest for all disciplinarians, especially those who spend their lives "unhonoured and unsung" in the slum schools of our great cities. A certain young hopeful—"Skinny" by name, and possibly by nature—had been voted incorrigible, and was at last taken before the chief of police, who proved for once to be the right man in the right place.

"The chief took the boy into his own office. It was the day before Hallowe'en, and he knew from dread experience that much mischief and some lasting harm were to be expected from the special gang of which this boy was the proud and acknowledged head. As the chief pondered the matter, he caught the gleam of admiration in the boy's eyes at the flash of the police-star on his breast. The glance sent a hopeful thought to the chief. Scolding and threats did the boy no good, nor did the police fines or other punishment. His parents took no interest in the training of the boy, and yet the chief fancied there was much good in him.

"'How would you like to be a policeman?' asked the chief slowly, rubbing his cheek reflectively with a brawny hand.

"The boy grinned cheerfully at the suggestion.

"'Yep,' he remarked briefly. 'Goin' ter be when I git big.'

"'I'd like to have your advice on a plan I've been thinking of for some time,' went on the chief confidentially.

"The boy straightened in his chair, fascinated at the thought of being taken into the confidence of the chief.

"'Now, we've always had a lot of trouble with some of the boys on holiday nights here,' said the chief, 'and it seems to me that you have a lot of influence with that crowd of yours, so I have been thinking of appointing you a special policeman for to-morrow night to see that there is no harmful mischief allowed on your street. What do you think?'

"The boy's eyes grew larger and rounder. For the first time in his life speech failed him. His customary language did not seem to fit the case at all. 'Gee!' he stammered, as his mind slowly grasped what it all meant. 'Would I have a star, jis' like the big fellers?'

"'You would wear a star like the other policemen,' said the chief gravely. 'You would be a specially appointed policeman, to serve without pay, of course, but fully authorised to preserve the peace and to make arrests, if necessary.'

"Accustomed as he was to the language of the police court-room, the boy listened breathlessly to these words. Pride swelled deep in his bosom. He rose importantly while the chief fastened on the star, the sign and signal of his authority.

"There was a long and confidential talk with his chief before he strode sturdily out of the door, and he squared his shoulders manfully as he left, for a duly detailed policeman must do his duty.

"Within the hour, the youthful special officer returned to the police station. He was accompanied by a barefooted and struggling lad, who struck out fruitlessly at his captor. An angry exclamation by the prisoner was ruthlessly choked by the flushed and perspiring officer.

"'Cut that out,' he ordered grimly. 'No back talk goes here; see?'

"The policemen loitering in the station eyed them with much amusement. But the special officer insisted upon conveying his struggling prisoner straight to the chief.

"He saluted gravely as he entered the office and displayed his capture.

"'Pinched him stealin' a gate, chief,' he announced in the street slang which was the only language he knew. 'I tole him it didn't go; see? I showed me star; but he run out his tongue and said no kid dast to pinch him. So I showed him; see? Ain't I gotter right to pinch any kid what's vierlatin' the law, chief—hey?'

"The chief patiently explained to the amazed prisoner that the boy officer had every right to arrest violaters of the law, and was acting under orders from the chief in so doing. The eyes of the prisoner rolled startlingly, and he wiped his forehead on his shiny shirt-sleeve reflectively.

"'I wanter be one, too, chief,' he begged; 'I kin help to keep de kids straight, as good as Skinny here. Go on, lemme be one, too.'"

What happened next may be read in the pages of the excellent children's magazine to which we are

* Published by Messrs. Warne and Co. Price 1s. monthly.

indebted. The whole thing reminds the writer of an effort made many years ago with an incorrigible, who was appointed captain of the school football team, and became at once the embodiment of law and order.

LAYING THE SPECTRE.*

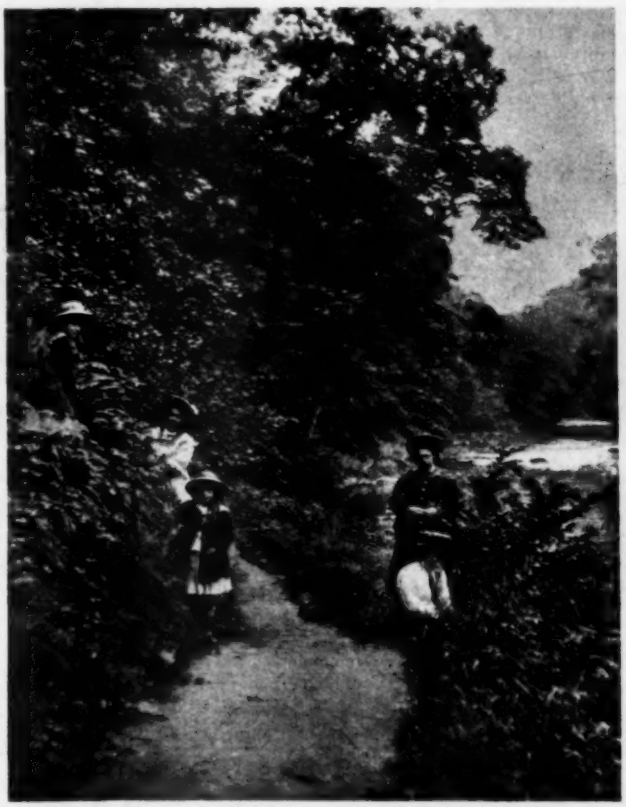
IN the great controversy on moral instruction Dr. Hayward appears to rank himself somewhat to the left of the Left Centre, to which Professor Sadler belongs.

At the outset of this suggestive and militant volume Dr Hayward sets up three lay figures for demolition—namely :—

"The vilest abortionist is he who attempts to mould a child's character." — GEORGE BERNARD SHAW.

"It is an error to suppose that human life can be built up from without, and its form and tendency determined by an artificial arrangement by another of the ideas it is to assimilate." — PROFESSOR J. WELTON.

"Imparting knowledge is not the teacher's business .....The educator has not to put something into his pupil, but to draw out from him what is in him." —J. H. SKRINE.



ON THE BANKS OF THE WHARFE.—SECOND PRIZE, PHOTO COMPETITION. By Miss Magoris, St. Monica's Secondary School, Skipton-in-Craven.

The controversy is really an old one in a new shape—that between believers in election and believers in the power of grace. Dr. Hayward is on the side of the angels and of grace. "The notion," he says, "that definite virtues are innate, not acquired—products of heredity instead of environment and education—is fatal to every dream of progress." It is curious how this echoes certain gracious words which must be kept out of this controversy by the tacit rules of the game.

Let those who, like ourselves, relish a very pretty quarrel follow Dr. Hayward as he lays about him with a right goodwill. Possibly our readers are more concerned with the practical conclusion, which is this—that along with the indirect moral training which accompanies membership in a well-organised school community, there must be direct moral instruction of an unmistakable character.

"Take yonder slum child who has never seen the Thames, or the Abbey, or St. Paul's; never a lake, or a woodland, or a hill; never touched literature, or heard an oratorio, or seen a picture. How is his mind built up? To prate about the child's 'soul' or 'faculties' helps us not at all. Application of the 'plant' metaphor or the 'drawing out' doctrine is equally futile. Galtonian statistics on 'heredity' merely depress. But when we focus our attention on the process of ceaseless fusion of ideas in the child's mind—ideas of tavern brawl and racing event, gutters and garbage—*we know what the slum child must become.* His apperception masses will be so few and narrow that he will grow up blind and deaf and unresponsive to the glories of time and space, for these his experience has never touched. Yet his apperception masses, such as they are, will possess a clear-cut intensity. Year after year the same examples and ideas have impressed themselves on him—fusion—fusion—nothing but fusion. He is now a hooligan. 'It is no good to appeal to him,' we are told by one despairing reformer. 'Boys are not influenced by moral instruction,' we are told by another. Both men are right—and wrong. *If, from his earliest school days, a wholesome, rich, and stimulating mass of story and poem and history had been the youth's repast (the study of nature is a harder thing to arrange, and, though precious indeed, is not entirely indispensable), it is doubtful whether his soul would ever have become entirely impenetrable to appeal or to instruction.*"

Here we are so entirely with our apologist — and we think we represent average opinion—that we begin to wonder whether his earnest advocacy is really necessary. We agree with him that the whole curriculum, rightly organised and seriously dealt with, is a moral instrument of tremendous power; further, that there are occasions when direct moral instruction is necessary, valuable, and really effective, in spite of a surface unwillingness to be influenced by sermonising. But when we come to examine the actual syllabuses of the direct instructors —even the best of them—we are conscious of a feeling of revulsion which the most rigid ecclesiastical catechism, or even the *Quicunque vult*, never inspired.

The recent Moral Congress appears to us to have been a more or less united protest against the secularist, who in his turn has been forced into an attitude of hostility to idealism by the fact that the Churches in their anxiety to preserve religious teaching have forgotten the teachings of Christianity. It is significant to those who try to read the signs of the times that there are many indications at the present moment of a desire for a return to the protection of a dogmatic

* *Education and the Heredity Spectre.* By F. H. Hayward, D.Lit., M.A., B.Sc. London: Watts and Co.

religious system in which faith has no connection with reason. For the lay mind is impatient of subtleties, and the ordinary man requires a refuge which the most exalted morality cannot afford.

But while the work of our schools is inspired and helped by men of the stamp of Dr. Hayward, there is no necessity for pessimism. There is not a practical teacher in the Empire who would not profit greatly by reading his book, and those who come under his direct influence would do well to follow his lead.

CONCERNING COLOUR IN PICTURES.

BY J. H. YOXALL, M.A., M.P.

THERE are plenty of folk who cannot sing a succession of even three notes in tune, and there are many people who are colour-blind. Almost incredible, but accurate, is the statement that not a few engine-drivers have been employed who could not differentiate between the red and the green distance signals. But it is perhaps as true that most of us are, if not colour-blind, ignorant about what produces colour. That is a matter about which the English public, even those of us who really love pictures, have concerned themselves very little; but of late an opportunity for doing so has arisen. In front of Monet's "Meules près Giverny" in the French Fine Arts Section at the Franco-British Exhibition, English people have stood criticising, condemning, or admiring, as French people did thirty years ago.

WASHING-DAY.—THIRD PRIZE, PHOTOGRAPHIC COMPETITION.
By T. Spark, Wesleyan School, Bishop Auckland.

M. Camille Mauclair, in his *L'Impressionisme, son Histoire, son Æsthetique, ses Maîtres*, gives the clearest possible account of the theory of colour which French artists have brought themselves, and are bringing the world, to accept. In Nature no colour exists by itself. The coloration of objects is not real—it is an illusion; the sole creative source of colour is sunlight, which directly or indirectly envelops all objects, and reveals them, with infinite modifications, at various hours. Matter itself is visually a mystery: we do not know the exact point or line of separation between reality and the unreal. All that we know is that our eyes are accustomed to discern two notions—one of shape and one of colour; but these two notions are properly inseparable. It is only artificially that we distinguish between the form of a thing and its hue; in Nature they are not distinct. It is light which reveals form, and it is light which, playing upon different states of matter—the pulp of fruit or the strata of a quarry—gives them dissimilar colours. When the light disappears, forms and colours disappear also. It is by the perception of different surfaces of colour that we perceive form.

The ideas of distance, perspective, and volume are given us by the appearance of colours more or less sombre or clear. That is what is called, in painting, the sense of values. A "value" is the degree of intensity, sombre or clear, which permits our eyes to discern that an object is distant or near or intermediate as compared with other objects. And as painting is only an imitation of Nature, and has at its command only two dimensions out of the three, "values" are the means by which painting can, upon a plane surface, make us perceive distance, profoundness, or nearness.

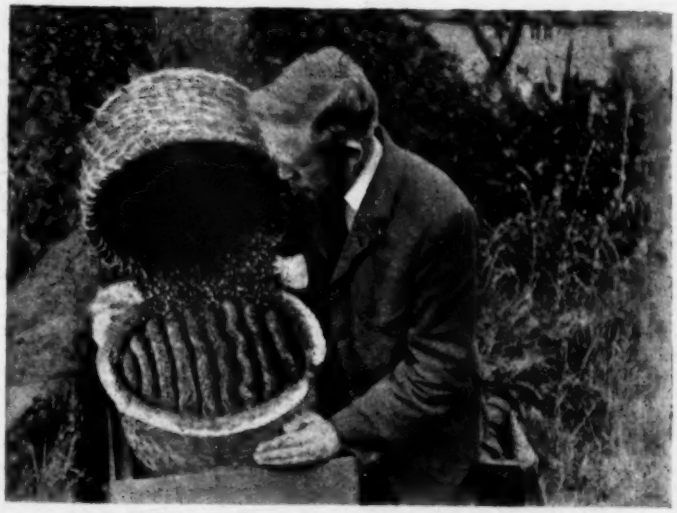
It is colour, then, which is the generator of drawing. Now colour is simply the irradiation of sunlight, and *any* tone of colour must therefore be composed of the elements of the solar spectrum—that is, the colours of the rainbow. Physics has taught us that these separate hues appear to us as seven because of the inequality of light-vibrations. Colours in Nature appear different to us for the same reason. Colours vary with the intensities of vibration. There is no colour proper and particular to a given object; there is merely a more or less rapid vibration of the light which touches the surface of the object. And physics teaches us that these degrees of rapidity depend on the angle of the rays, which, according as they are more or less vertical or more or less oblique, illuminate and colour the object differently.

Form and colour are, then, two illusions which coexist, the one by the other; form and colour are merely two names for the summary processes which the mind uses in perceiving Nature. No form without colour, no colour without form. It follows that what is called "local colour" does not exist. A leaf is *not* green, the trunk of a tree is *not* brown; and according to the hour of the day and the state of the light (scientifically, according to the angle of incidence) the colours of the leaf and the trunk will modify. That which an artist, and also a picture-viewer, should study in a picture is the composition of the atmosphere which intervenes between the objects and the eye. The *atmosphere* is the true subject of every picture, for all that is represented only exists through atmosphere.

A second result of this analysis is that shadow is not an absence of light, but *light of other quality* and of

another "value." A shadow is not a part of a landscape where the bright light does not go, but a part where the bright light is subordinated compared with light elsewhere which seems to us more intense. A different rapidity of vibration exists in shadows, that is all. An artist, therefore, instead of representing a shadow by dark tints derived from brown, black, or gray, should represent, even in the shadows, as in the brighter portions of the picture, the play of atoms of solar light.

A third inferential consequence is that in the shadows the colours modify by refraction. That is to say, for example, in a Dutch picture of an interior, the source of light—the window—may not be visible, and the light which gives atmosphere to the picture will therefore be composed of *reflections* of rays—rays which one does not see; and all the objects in the picture, being, so to speak, mirrors upon which the various reflections of the invisible rays collect and mingle, are influenced in colour accordingly. These reflected colours influence each other, even upon objects which have dull surfaces. A pot of red earthenware standing on a blue carpet gives rise to an exchange, very subtile but mathematically real, between the red of the pot and the blue of the carpet; and this exchange of luminous and tinted reflections creates between the red and the blue a zone of composite reflections made up of red and blue. These composite reflections constitute a gamut of *complementary* tones—complementary to the two principal colours, red and blue. In optics these complementary tones can be measured and evaluated mathematically. For another example: if a man's face is seen at a window, one cheek lit by the orange daylight and the other by the bluish light from the "interior," on the nose and the medial region of the face there will be green reflected lights, because green is a tint composed of yellow and blue.



KNOWLEDGE IS POWER.—HIGHLY COMMENDED, PHOTOGRAPHIC COMPETITION.
By Mr. William Darrington, Eastwood National School.

The final deduction is that the appearance of objects reaches our eyes by a *parallel projection* of colours, each colour projected distinctly and side by side as in the spectrum. It is artificially, so to speak, that our eyes mingle and unite them; it is a well-known experiment in optics that a lens will dissociate that which the eye has united, and show us seven distinct colours.

Just as artificially does a painter mingle various colours on his palette in order to compose a tint. Artificially, again, have the artists' colourmen manufactured tubes and cakes of distinct and apparently homogeneous colour for painting with. Such mixtures are optically and artistically false, and have the disadvantage of producing dullness and heaviness of colour. If you mix *all* the colours on a palette into one, you do not get the white of light, but a dirty gray. What, therefore, ought the true artist, anxious for verity, to do when endeavouring to represent the divine beauty of Nature? It is here that we touch the very root and principle of Impressionism. The artist ought to paint with the seven colours of the spectrum only, and not with mixtures, the Impressionists say. That is what Monet does, though he yields so far as to add white and black to his palette. And further, the artist ought not to *mix* the seven colours in his touches on the canvas; he ought to put on his canvas the seven colours *in juxtaposition*, and let the local reflections of the colours mingle under the eye of the picture-gazer, just as they do before the eye of the gazer at the landscape itself.

Here, then, is the full theory of the *dissociation of tonalities*, which is the cardinal principle of Impressionist art. Suppress all mechanical mixtures, leave to each touch of pure colour its native power, and consequently its native freshness and *éclat*. It is the *light* which thus becomes the true subject of every Impressionist picture; the interest of the objects on which the light plays is secondary. "The play's the thing," said Hamlet; the Impressionists cry, "The light's the thing."

The theory which I have now so briefly and imperfectly stated will be open to optical and scientific criticism at many points, I know, and *I* do not father it; but it *is* the Impressionist theory. Right or wrong, it is the theory which is profoundly and widely influencing contemporary art; and nobody can intelligently look at modern pictures who does not know of this theory. That is why I have ventured to write about it here. And here I add M. Mauclair's summary of the theory: "Suppression du ton local, étude des reflets par les couleurs complémentaires, division des tonalités par le procédé des tâches de couleurs pures juxtaposés, voilà les essentiels principes."

AN EXCELLENT ROMANCE.

We have just completed the reading of Mr. Yoxall's newest novel, which bears the title *Château Royal* (Smith, Elder, and Co.), and cordially recommend all our readers to lose no time in making acquaintance with its manly hero and charming heroine. We also recommend all theatrical managers who read the *Practical Teacher* to consider the possibilities of the novel as a drama, for to our lay mind they appear to be great. Mr. Yoxall does a daring thing when he introduces a "nurse" to his Juliet, for he invites comparison not only with Shakespeare, but also with Meredith; yet he comes brilliantly out of the tremendous ordeal.

N.U.T. NOTES.

BY ALLEN CROFT.

THE educational administration of the most democratic Government of modern times is chiefly characterised by cynical indifference to the principles mouthed from public platforms by the various "leaders" of the Liberal party. A year ago the ridiculous Teachers' Register—which never saw the light—with its egregious "Column B," disappeared from public ken, only to reappear, *in essence*, by the issue of two separate and distinct sets of regulations: (1) "For the training of teachers for elementary schools," and (2) "For the training of teachers of secondary schools"—a form of differentiation more dangerous and vicious even than that swept away in the old Register.

"Column B" in Excelsis.

And what, forsooth, is Sir Robert L. Morant's justification? Well, here are his own words:—

> "There is undoubtedly a great deal that is common to the needs of all kinds of teachers, but the effective handling of the subjects and the pupils of different types of secondary schools must obviously call for familiarity with the special conditions of teaching peculiar to those schools, as distinguished from teaching in elementary schools on the one hand and from university teaching on the other."

The "special conditions of teaching peculiar" to secondary schools are the direct result of the obstacles placed by the Board of Education itself in the way of the development of the elementary schools; and naturally enough the Executive of the N.U.T. are making a most vigorous protest against the Government's "sheep and goats" policy of separating teachers for elementary and secondary schools into two separate classes. The Union will continue to demand opportunities for the freest interchange of teachers for *all* classes of schools, and will take every opportunity of denouncing this latest instance of administrative snobbery.

* * *

I SUGGESTED, in the columns of the *Practical Teacher* a month or two back, that Sir Robert L. Morant must seek to cover the defects of his administration—for it is useless to pretend any longer that his various "chiefs" (Sir William Anson, Mr. Birrell, Mr. M'Kenna, and Mr. Runciman) have been more than figure-heads—by inditing prefatory memoranda of quite unexceptionable excellence. But unless he is absolutely devoid of humour, he must indulge in many a chuckle as he reflects how little he does to carry out the principles he adumbrates. He is almost humorous when referring (in the prefatory memorandum to the regulations for the training of teachers for elementary schools) to the duties of such teachers:—

Precept and Practice.

> "Duties, which are in a very real sense 'special' for many reasons, *and particularly because the classes in our elementary schools are still (unfortunately) too large*, and the conditions under which so many children come for their lessons are so disadvantageous."

Considering how obstinately he has, during his *régime*, resisted every attempt on the part of the Executive to secure any improvement in Article 12 (a) of the Code, and remembering how he alone is responsible for the introduction of the student-teacher, counting for forty-five children in average attendance, one cannot but think that his smile would be unusually sardonic as he completed the above-quoted paragraph.

Here is another gem from the same memorandum:—

> "It will not be surprising if, as time goes on, *it is found that many of our schools are in the hands of teachers who have been very inadequately equipped in some important directions for the daily duties of their profession.*"

This, from the man whose policy is closing pupil-teacher centres, and will in the future fill our training colleges with boys and girls who have not done a day's teaching, is calculated to make the heart of the scoffer rejoice.

A NEEDLEWORK SYLLABUS.*

THREE YEARS' CYCLE.

Requisites.—A sewing machine (this must be provided locally). Cutting-out scissors. Note-books and squared books for patterns.

Time.—Twenty-three lessons of at least one hour per week.

Aim of the Course.—To learn to cut out, make, and repair a complete outfit for a girl leaving home for the first time to enter domestic service or other employment.

* Designed for Evening Schools. Reproduced by the courtesy of W. Pullinger, Esq., Director of Education, Wilts County Council.

FIRST YEAR.

1. To make the list of necessary garments.
2. To draw, cut out, and make three of these garments—for example, chemise, knickers, and print or galatea petticoat.
3. Knit a woollen vest and practise repairing.
4. To practise all stitches, especially work at patching, darning, and button-hole specimens.
5. Make notes as to best materials, prices, etc.
6. Patterns and dimensions to be put in squared books.

SECOND YEAR.

1. Recapitulate and go through list.
2. To draw, cut out, and make three more garments on list—for example, flannel petticoat, apron, and under bodice.
3. Knit stockings.
4. Practise *all* stitches, paying special attention to marking, herring-boning and gathering, and sewing in.
5. Repairing of own garments brought from home, such as patching of calico, print, and flannel garments, darning of socks and stockings, tears in dresses, cuts and holes in table linen. (If pupils will not bring their own, as is often the case, it is a good thing for the teacher to provide specimens of the above if possible, as repairing an *actually worn garment* is of far greater practical use to a girl than the constant working of specimens.)
6. Notes and directions to be entered in note-book.
7. Drawings and dimensions of patterns to be put in squared books.

THIRD YEAR.

1. Recapitulation and completion of list of garments.
2. To draw, cut out, and make linen bag, coarse apron, and print dress. Knitting a pair of woollen gloves.
3. Practise *all* the stitches, especially working gussets, tapes, button-holing, feather-stitching, and darning.
4. To practise all kinds of repairing on garments requiring it.
5. Notes and directions as to material, etc., to be entered in note-books.
6. Drawings with dimensions to be put in squared books.

Machines are very generally used now, and, as a rule, are found in nearly every cottage, so that to teach girls at this age (probably from fourteen to eighteen) to use them *properly* will be of great advantage to them in after life. On no account should hand sewing be discouraged; long seams, tucks, and stitchings could be done by the machine, while the neat finishing off and the working of all the most important and in some instances apparently trivial parts of the work should be done by hand carefully. Machining should encourage a correct eye and an accurate speed at work, so that by introducing a sewing machine at these classes a *greater amount* of work should be done *carefully* in the time.

ENGLISH IN THE SCOTTISH LEAVING CERTIFICATE EXAMINATION.

THE following Departmental direction will be found helpful by teachers of English outside of the northern kingdom:—

> "In regard to English literature, the Department think that, in the case of the Higher Grade, candidates may be expected to have some acquaintance with the authorship and period of the leading masterpieces of our literature. This need involve no multiplicity of biographical or bibliographical detail, and it may be acquired with no undue burden of time or labour. Knowledge of literary history should in all cases be based upon a first-hand acquaintance with literature itself, acquired by the careful study of a few well-chosen masterpieces, supplemented by more cursory reading in a wider but no less carefully selected range of English classics. Answers which show that the study of English literature has been interpreted to mean the committing to memory of lists of authors and their books—and the answers of candidates so trained seldom fail by an occasional absurdity to give evidence of such training—will be treated with the utmost rigour, and will not be held to compensate for deficiency in the essential parts of the examination. On the other hand, such answers as show independent reading, careful and methodical instruction, or intelligent criticism will be accorded full weight in adjudging marks. Lower Grade candidates cannot be expected to have read so widely, or to have acquired such powers of reflection, and the standard of attainment required of them n this part of the subject will be correspondingly less exacting. Literary history in particular will form a comparatively unimportant element in the examination in this grade; but with this difference—the study of literature, so far as it goes, should aim at the same ends, and be prosecuted by the same methods, in both grades."

Our Art Section.

SOME WELL-KNOWN BRITISH MEZZOTINTERS.

X.—CHARLES TURNER, A.R.A.

BY W. E. SPARKES.

DEVOTED to his art, Charles Turner passed a very uneventful life in London, and his even life is reflected in his calm and deliberate mezzotints. An accident brought him early in touch with fine art. His father, an excise officer, having mislaid some valuable papers, was dismissed from his Government post, and soon after died, upon which Charles's mother went into the service of the Duchess of Marlborough at Woodstock. Here she had charge of the celebrated china gallery, where there was a collection, not only of rare porcelain, but also of fine art treasures—paintings, carvings, ivories, and *bric-à-brac* from all the corners of the earth.

Young Turner roamed among these at his will. They appealed strongly to his sensitive nature, and when he was discovered copying, with some skill, one or two portraits, it was decided that he should be sent to London to study art seriously.

In 1795, when in his twenty-first year, he had already passed through the Royal Academy Schools, so that he had more than a passing acquaintance with art, and had attained a knowledge and skill that formed a sure foundation for his after-work as an engraver.

It was not long before he tried his hand at mezzotint, then by far the most popular and most fashionable form of engraving. His friend John Jones, an admirable mezzotinter, died in 1797, leaving to Turner his fine collection of prints. This was the turning-point in his career. Throwing overboard all his projects of becoming a portrait painter, he set himself, in his usual dogged fashion, to rival the past and present masters in mezzotint. Nothing came amiss to him. He was ready to copy the old masters—Rembrandt, Rubens—or even the old miniature painters, such as Cooper and Isaac Oliver; it was indifferent to him whether he tried his hand on portraits by Hoppner, Shee, Romney, and Raeburn, or on landscapes by the great living master, J. M. W. Turner.

I have pointed out in former papers how frequently an artist found one engraver especially suited to his style. Lawrence had no better translator than Samuel Cousins; Constable backed up David Lucas through thick and thin, and in spite of professional contempt; George Morland's pastorals were nobly engraved by William Ward; and if there is one name more than another that comes to mind among the many engravers employed by J. M. W. Turner, it is Charles Turner.

A collector nowadays is fortunate if he can pick up the latter's magnificent mezzotint of J. M. W. Turner's "Shipwreck"—a work so supremely fine that, when the artist determined in 1806 to issue his famous *Liber Studiorum*,* he gave the first commission to Charles Turner.

Under the eye of that most martinet of painters the work went steadily forward until the twentieth plate, when the engraver mildly intimated that the price paid him should be increased from eight to ten guineas each plate; upon which the irascible painter flew into a rage, turned the engraver about his business, and refused to speak to him for nineteen years. The fault was entirely the painter's, for Charles Turner was particularly noted for his "sweet temper" in the strange Bohemia in which artists and engravers lived; and the artist seems to have had some dim consciousness that the fault lay at his door, for he wrote a pathetically incoherent letter to console the engraver upon the death of his wife in 1836.

Charles Turner was the most industrious mezzotinter in the world. No less than 921 plates are attributed to him, besides numberless "odd jobs." Add to this several drawings and paintings exhibited at the Royal Academy, and it is evident so busy a man had small leisure to look about him. As a matter of fact, having taken a house in Warren Street, Fitzroy Square, he lived there for fifty-four years, working on placidly without hurry, and also without rest, while the neighbourhood changed its character and his old friends died out one by one. He was irritable only when interrupted at his work, as when Turner (the artist) "called in for a few minutes, and sat chattering for two hours."

Charles Turner was wonderfully versatile, and had the supreme gift of all great engravers—the power to change his method according to his subject. And these were varied enough in all conscience—portraits, landscapes, marine views, animals, ships, battle-pieces, and prize-fighters—a pleasing variety only equalled by the masterly manner in which he added strength or delicacy by using the etching-needle or aquatint on his plates.

Such industry in the heyday of mezzotinting spelt fortune. He was elected an Associate of the Royal Academy in 1828, and upon his death left a fortune of £19,800.

The two portraits selected as illustrations show aptly enough how Turner varied his method. The one is from an old miniature, the other from a modern painting.

"QUEEN ELIZABETH." (From a miniature by Isaac Oliver.)

Great art is not to be measured in yards and feet. The delicate outlines on ancient Greek vases are finer in art than many pretentious paintings that have only their vast size to cause astonishment, and the exquisite miniatures for which the seventeenth and eighteenth centuries are noted surpass in beauty and strength the poor portraits of a later age.

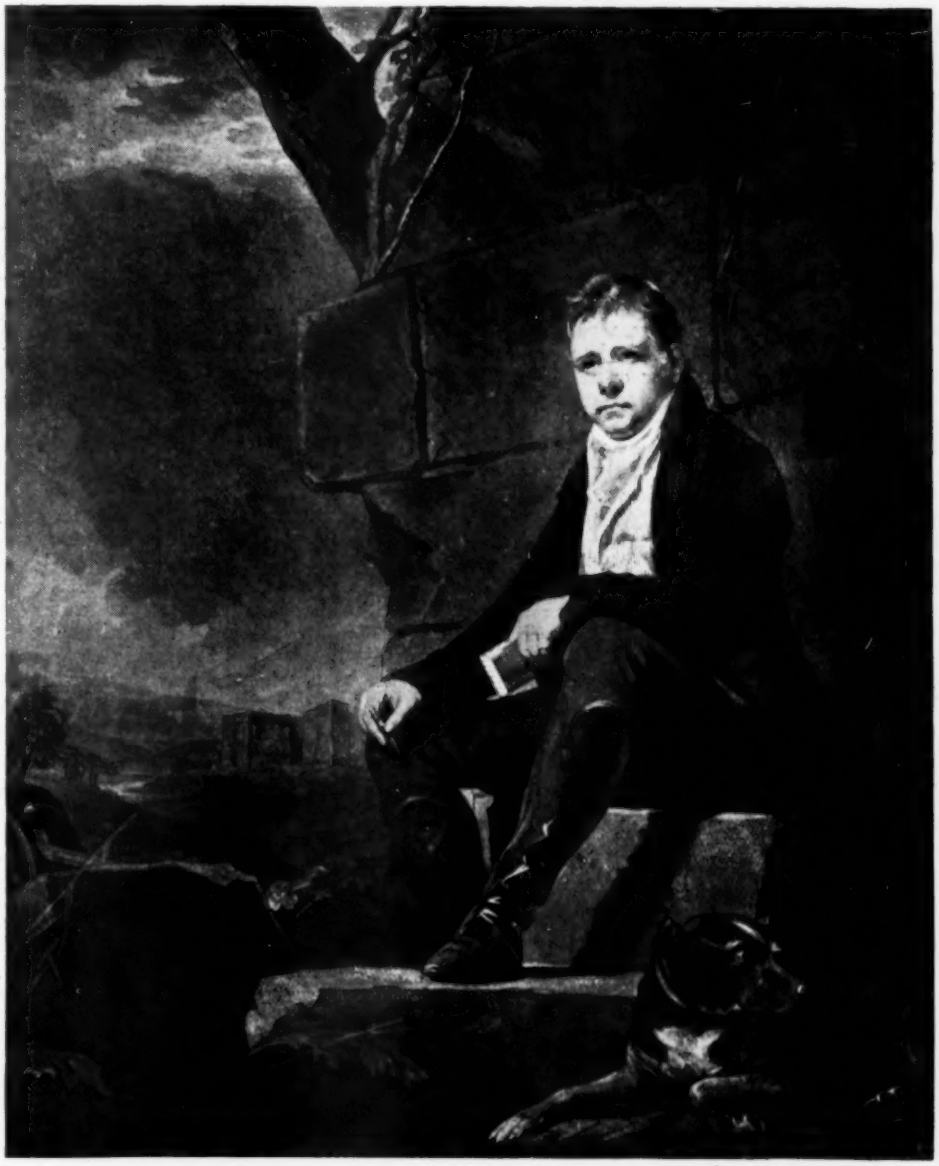
The Greeks were not the only people to delight in small drawings. Long before books were printed there were manuscripts that were cherished for their marvellous handwriting, and still more for the painted designs surrounding the page—floral ornaments and

* See *Practical Teacher* for March.

"Queen Elizabeth." (From a Miniature by Isaac Oliver.)
(Photo by H. Koester.)

initial letters unsurpassed to this day. It is an unceasing delight to encounter in our museums these dainty saints and angels painted in bright but harmonious colours upon a golden background—little jewels of art attesting the devotion and care of the painters, monks who passed their quiet life in decorating the sacred books, or freemen of the Guild of St. Luke employed by some royal patron to make books as fit presents to a foreign court.

No wonder that when printing took the place of manuscript the artists were still employed to design initial letters and small illustrations to the text, so that the art never died out completely. Before long, paintings in small—portraits chiefly—became fashionable in Italy and France. The Tudors welcomed all the foreign arts. Englishmen in those days appear to have had no skill in portraiture. Everywhere we encounter, onwards through the age of the Stuarts, such foreign artists as Holbein and Van Dyck, and only occasionally does some undoubted native name appear in the corner of paintings and miniatures.



"Sir Walter Scott." (From a Painting by Sir Henry Raeburn, R.A.)
(Photo by H. Koester.)

Among these Isaac Oliver may be counted, though some authorities see in the name a foreign origin.

At any rate, Isaac Oliver was born in Leicestershire in 1551, and was employed by Queen Elizabeth.

This present mezzotint is from a miniature portrait on cardboard measuring about ten inches in length. Its old-fashioned air is unmistakable: Charles Turner

has admirably caught the quaint style and reproduced the wonderful detail so characteristic of the age.

It would be impossible to scrape out such tiny lights with a pointed tool. In fact, Charles Turner at first made an etching which can be traced in all the lines. If one could have seen his plate before the ground was "rocked" over it, one would have found it almost as complete as the finished mezzotint. It is only in the soft shadows on the face and hands, on the curtain and the background, and on the broad masses that shade the dress and give solidity and roundness, that the mezzotint is apparent; but the combination of etching and mezzotint is perfect in giving the effect—meticulous detail put in with tiny strokes, with a quiet shading here and there.

It is a curious portrait, but still an advance on ancient methods. Isaac Oliver's excellence lies partly in this—he approached more nearly the modern ideal; for whereas the former practice was to keep an outline only, or to force the shadows, he kept them in their true relationship.

Queen Elizabeth had no liking for shadows, which, she thought, masked the form. Her court painter was Oliver's master, Nicholas Hilliard, who has left on record the queen's (and his own) view on the greater importance of line. "The principal part of painting or drawing from the life consisteth in the truth of the line." And again he says: "This makes me to remember the words also and reasoning of her Majesty when first I came in her Highness's presence to draw, who, after showing me how she noticed great difference of shadowing in the works and diversity of Drawers of sundry nations, and that the Italians, who had the name to be cunningest and to draw best, shadowed not, requiring of me the reason of it, seeing that best to show oneself needeth no shadow of place, but rather the open light, I" (Nicholas Hilliard) "gave my opinion that her Majesty was right, but that some workmen liked shadows to make the head imboss well" (to stand out roundly) "to show well afar off, but that Limning was to be seen near, and therefore required no shadow"—an admirable distinction by the old Tudor painter between portraits in large to be placed on a wall and those small miniatures to be handled and peered into at close range. We are not surprised that "her Majesty took her seat where the light was full on her."

Of course this became the tradition; and even Isaac Oliver added little shadow to the face of his portrait, though in other respects he advanced on his predecessors. For one thing, he did not confine himself to blue backgrounds. He set the fashion of broadening the shadows—an attempt at truthful rendering that developed in later hands, until the finest miniatures of the Stuart period (such as those by Samuel Cooper), and onwards to the eighteenth century, are as broad as large paintings by Reynolds and his school.

Horace Walpole had strange tastes in art. His gimcrack house at Strawberry Hill, with its ridiculous Gothic elevation and its queer collection of odds and ends, would argue a quaint turn in artistic likings, but he wrote many acute remarks in his incomparable letters. For instance: "If a glass could expand Cooper's pictures to the size of Vandyke's they would appear to have been painted for that proportion." One who remembers such admirable miniatures as his "Duke of Monmouth" will agree with Walpole's dictum.

Isaac Oliver died at Blackfriars (and therefore near Shakespeare's theatre) in 1617. It is pleasant to think that the poet most probably knew the artist. May we read his delight in these dainty paintings in Bassanio's description of Portia's miniature?—

> "What find I here?
> Fair Portia's counterfeit! What demi-god
> Hath come so near perfection? Move these eyes?
> Or whether, riding on the balls of mine,
> Seem they in motion? Here are severed lips,
> Parted with sugar-breath; so sweet a bar
> Should sunder such sweet friends. Here in her hairs
> The painter plays the spider, and hath woven
> A golden mesh to entrap the hearts of men
> Faster than gnats in cobwebs; but her eyes!—"

How complacent the old miniaturist would have been if he could have applied such glorious praise to a portrait of his!

"Sir Walter Scott." (From a painting by Sir Henry Raeburn, R.A.)

It is a far cry from Isaac Oliver to Raeburn. In the one we see British portrait-painting feeling its way tentatively; in the other, the art in its perfection. The old miniature is painted in the style of the Pre-Raphaelites—that is to say, with minute attention to every detail, even to the pattern of the lace collar, and with an absence of atmosphere. The queen is detached sharply from the background, almost as though one were looking at a painted cardboard figure rather than at a person seen through a thin-drawn veil of air. Moreover, this excessive care for every particular results in making as much of the dress as of the face and hands.

But the portrait of Raeburn is directly opposed to this in every particular. Raphael and his school had taught men to look for breadth and grace, to subordinate the unessential dress to the supreme interest of the human countenance, and in addition to this to place objects in their true relationship to one another—to force the background to play its part in the composition, not by neglecting or slurring it, but by using it to add interest by emphasising and harmonising it with the principal figure.

This has been the custom of every great portrait-painter since the age of Raphael. Holbein, Velasquez, Murillo, Van Dyck, Sir Joshua Reynolds, Romney, Gainsborough, and Raeburn all alike compel instant attention to the heads, and after that to the hands. No matter how rich and elaborate the dress, it is only of secondary interest, its colours and its disposition leading the eye continually back to the supreme point of interest.

The old miniaturist had no place for this scheme and gradation. But such painters as Velasquez or Titian carried one thought through every detail. If it was a "Surrender of Breda," the defeated army appeared under a lowering pall of smoke and with disordered spears, while on the other side of the picture the victorious soldiers had the bright sky as a canopy and carried their lances high. In Titian's "Martyrdom of St. Peter" the trees seem to start aside in fright, and their branches are blasted in parts as by lightning.

It is not difficult to understand why Raeburn places Scott among ruins, with a castle and a romantic scene as the background. The novelist is reconstructing the past and peopling these ruins with his bright creations. He sits ready to jot down his ideas as they are called up by his surroundings; the artist not merely paints the features, but adds the proper expression of the moment. Most important of all in a great portrait is

the painting of character, the soul shining in the face. Velasquez painted unscrupulous popes and scheming politicians with such unconscious truth that Hazlitt declares in one of his table-talks he would have been terrified to sit alone in the same room with such paintings. Beside this excellence everything else is insignificant.

Raeburn was an admirable portrait painter. Shrewd Scotch lawyers, perky lairds, humorous drinking Balfours, soldiers, politicians, artists, and authors, his clients live for us again on his canvases, not merely in the habit as they lived, but with their character and pursuits written in unmistakable lines. There are a breadth and a manliness in all his portraits very refreshing to see. Wilkie compared him to Velasquez, whose "bold square touch" came as a revelation to an artist who had painted peasants in the small manner that was then the fashion. Like Velasquez, too, was Raeburn in his rich depths of colour and his corresponding strong lights; there were a directness and a simplicity in his method that showed the accomplished craftsman. He was born in Edinburgh in 1756, and had to struggle during his early manhood; but having inherited a fortune through his wife, he spent the remaining years of his life busy, prosperous, and happy. His means allowed him to travel in Italy, where he studied the great Italians, and formed his art upon theirs. He was knighted by George the Fourth.

This portrait was painted in 1808. Scott's biographer, Lockhart, says: "His person at that time may be exactly known from Raeburn's first picture.....a most faithful likeness of him and his dog Camp." Of this portrait Charles Turner's mezzotint is noted as the first and the most masterly engraving.

Scott's portrait was frequently painted, but very few artists succeeded in expressing his intelligence and his extraordinary height of forehead. Some cut down the head to classical proportions, and thus utterly failed. As Raeburn once wittily remarked of the novelist, "Scott had a *story* more in his head than any other man."

It will be seen that Sir Walter is sitting well above the spectator's eye. This was a common feature in Raeburn's portraits, not always approved by some of his friends. Allan Cunningham said: "He always placed his sitters on a platform. The notion is that people should be painted as if they were hanging like pictures on a wall—a Newgate notion, but it was Sir Joshua's."

Charles Turner differed from William Ward in one particular. Both were remarkable for the rich modelling they expressed in heads and hands, as well as for a broad simplicity in shades—a handling perfectly suited to translate the masterly portraits of the time. But whereas William Ward depended very slightly upon the etched line, it was Turner's practice to lay out all his engravings with definite lines, over which he mezzotinted a strong ground. But if his engravings are thus hardly to be classed among *pure* mezzotints, he so skilfully combined the arts that, unlike many inferior men, the etched lines do not force themselves too strongly among the tints. With these fine examples at hand, it is perhaps needless to point out the fine draughtsmanship that reveals the trained artist.

MANUAL TRAINING IN GLASGOW.

BY WILLIAM HUME RODGER, WOODSIDE HIGHER GRADE PUBLIC SCHOOL, GLASGOW.

II.

THE bench in use is the ordinary dual bench, a photograph of which is given. It is a strong, serviceable bench, made of red pine and fitted with two quick-grip

FIG. 4.—DUAL BENCH.

FIG. 5.—WALL-BRACKET FOR HOLDING EXTRA TOOLS.

vices, two collapsible drawing-racks, and two sloping tool-pockets, to which special attention might be drawn. These tool-pockets are about five and a half inches deep, with the bottom sloping to the front, thus giving greater convenience. Each pocket holds a jack-plane, four chisels, a dovetail saw, a marking-knife, a try-square, a marking-gauge, and a twelve-inch rule. At the ends of the bench the trying-plane, brush, and cutting-blocks are hung, leaving the top of the bench free from tools when not in use. The advantages of this arrangement are—the classroom looks more orderly, the tools can be easily inspected, and the tool-pockets easily cleaned.

The extra tools are inserted in a wall bracket, as shown in the photograph. This bracket is fitted up in a central position convenient to the class, and also to the teacher, who can check the number of tools at a glance. The special tools are fitted up in one of the wall-presses as shown.

The main idea, of course, is to prove to the boy that by having a place for everything, and keeping everything in its place, order and progress are attained.

THE SCHEME OF WORK.

In Glasgow, fortunately, there are no hard-and-fast lines laid down as to a scheme of work. Each teacher is allowed to make out and work to his own scheme, provided, however, that he keeps in view certain aims. One of the many advantages arising from this idea is that the teacher can make his scheme to suit the capabilities of the children in his particular district. The aims are classed under two heads—namely, "The Practical Side" and "The Educational Side"—and are as follows :—

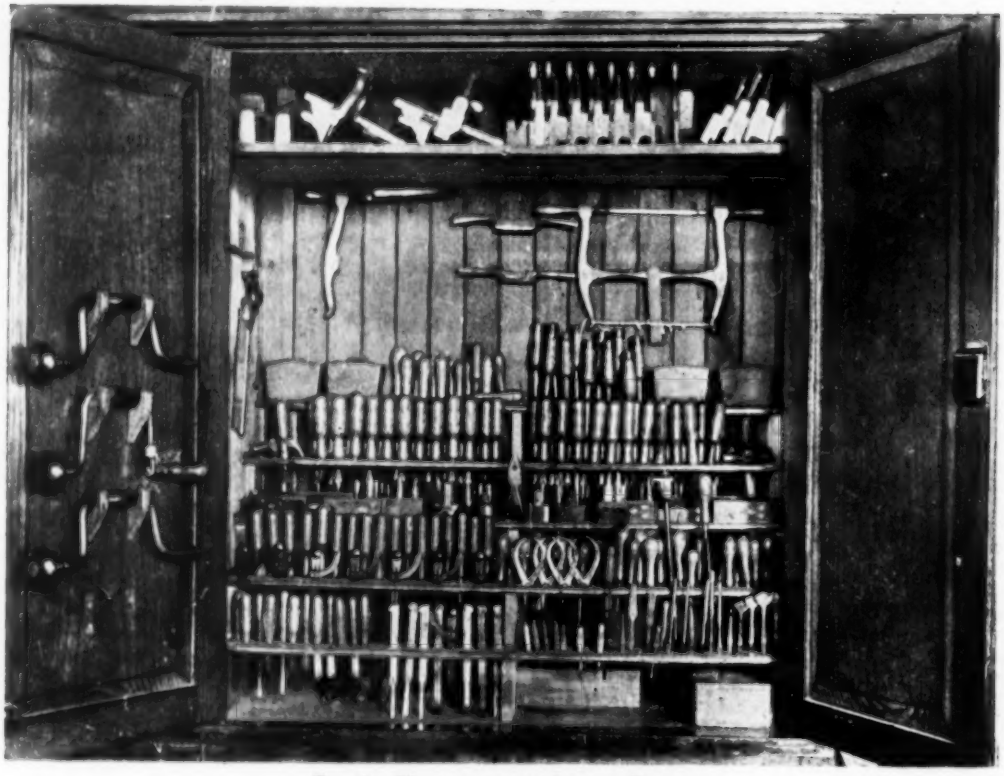
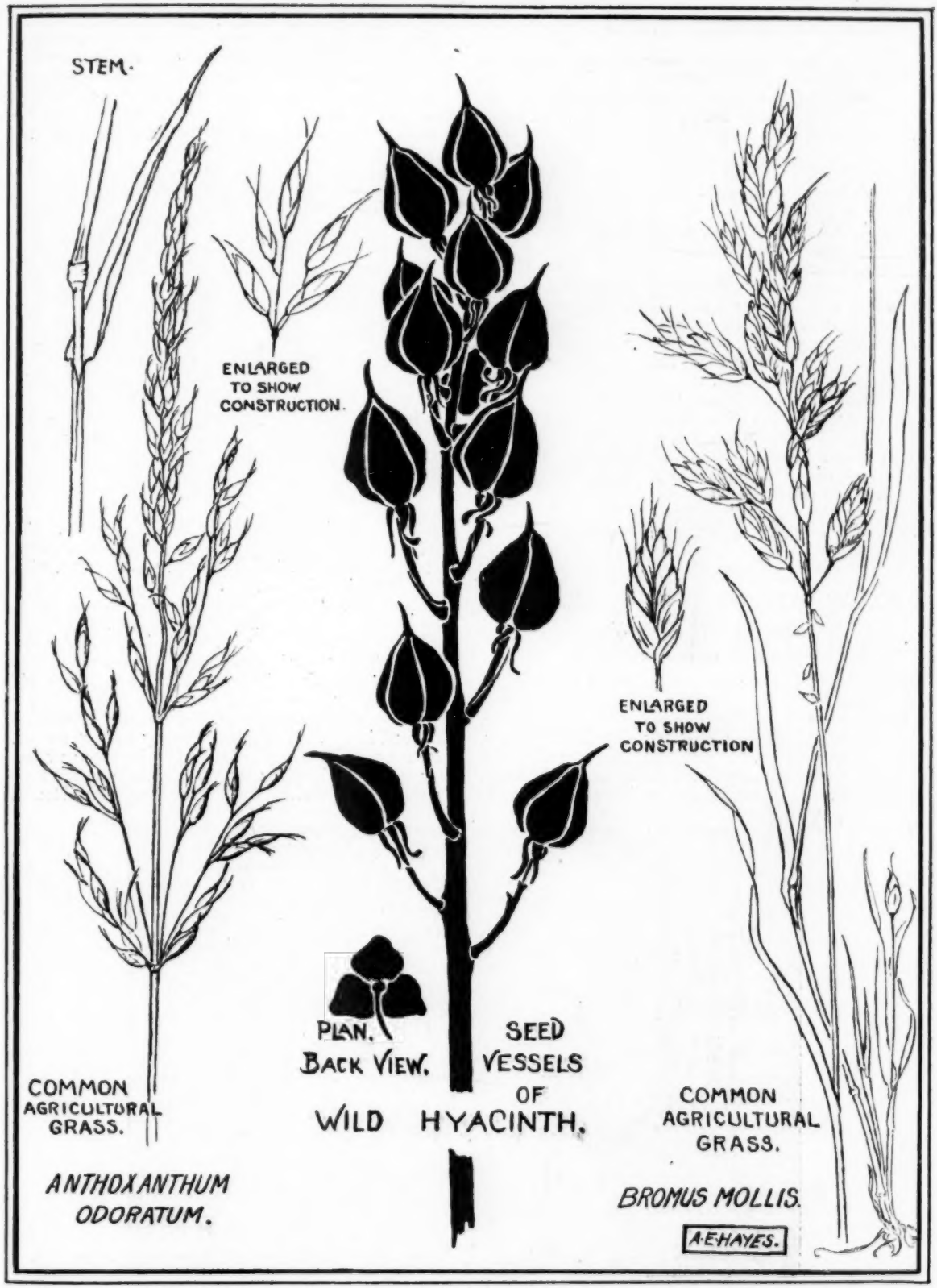


FIG. 6.—WALL-PRESS FOR SPECIAL TOOLS.



DRAWING FROM NATURE.

1. The Practical Side.

(*a*) Acquisition of the workman's touch.
(*b*) Correct method of handling tools.
(*c*) Full knowledge of the materials worked with.
(*d*) Intelligence and capacity to plan out and execute a piece of work.

2. The Educational Side.

(*a*) To train in order, neatness, exactness, and cleanliness.
(*b*) To train the hands to accuracy and correct obedience to the dictates of the eye.
(*c*) To train the eye to see accurately, and also to train in attention, industry, perseverance, and patience.
(*d*) To train the boy to be independent and self-reliant.

To describe more than one scheme of work in this little article would take up too much valuable space, consequently the details of one scheme only are given. This scheme is meant to cover a three years' course, which will be submitted in the next issue.

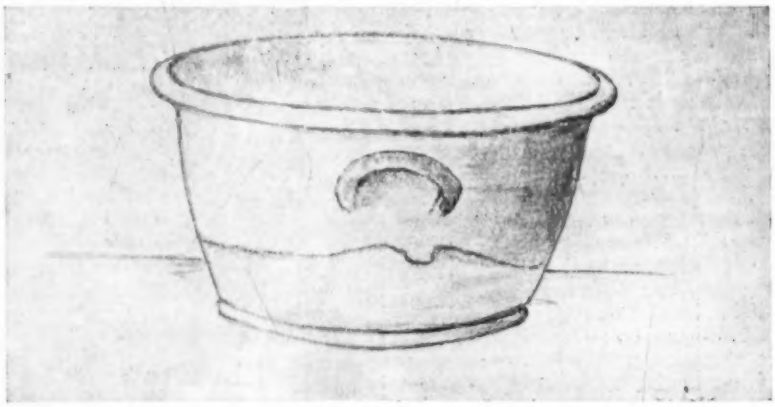


Fig. 3.

PRACTICAL DRAWING LESSONS.

CLASSES V. AND VI.

Objects in Light and Shade.

THE work done in the senior classes of a school must include the complete study of objects and natural examples in light and shade and in colour. To carry out this study with anything like efficiency, it is necessary to have something in the way of special equipment which is not found in the usual classroom of a school. The room should be lit from the roof or from one large side-window. The lack of a decided light on the model, and the bewildering confusion of minor cross-shadows one always finds in a room where there are several lights, and these probably in opposite or adjacent walls, make this study almost impossible. The work is at all times difficult enough, and for beginners arrangements should be made to have the lighting conditions as favourable as possible. The seating and fitments of the room should also be such as to give every pupil a clear and unobstructed view of whatever is being studied. There should be a good supply of models to draw from, and some attempt should be made to place a suitable background which will simplify and harmonise with the objects forming the group. These conditions are essential, and where they can be secured by a little manœuvring the work will be rendered much easier and more successful.

As regards the working medium, there are many suitable, and it would be advisable to try more than one. Common pencil on small sheets of white paper will do very well to begin with; but this should be varied later by working with chalk and charcoal or with coloured

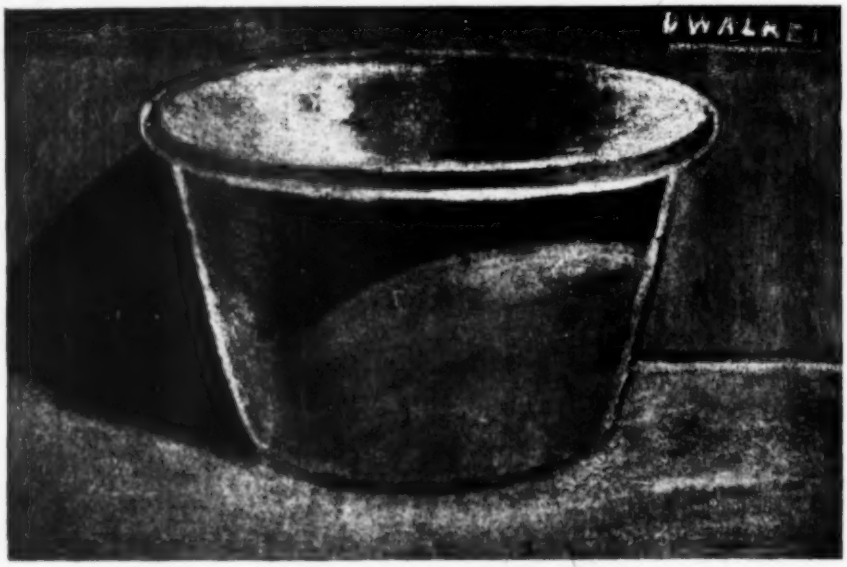


Fig. 4.

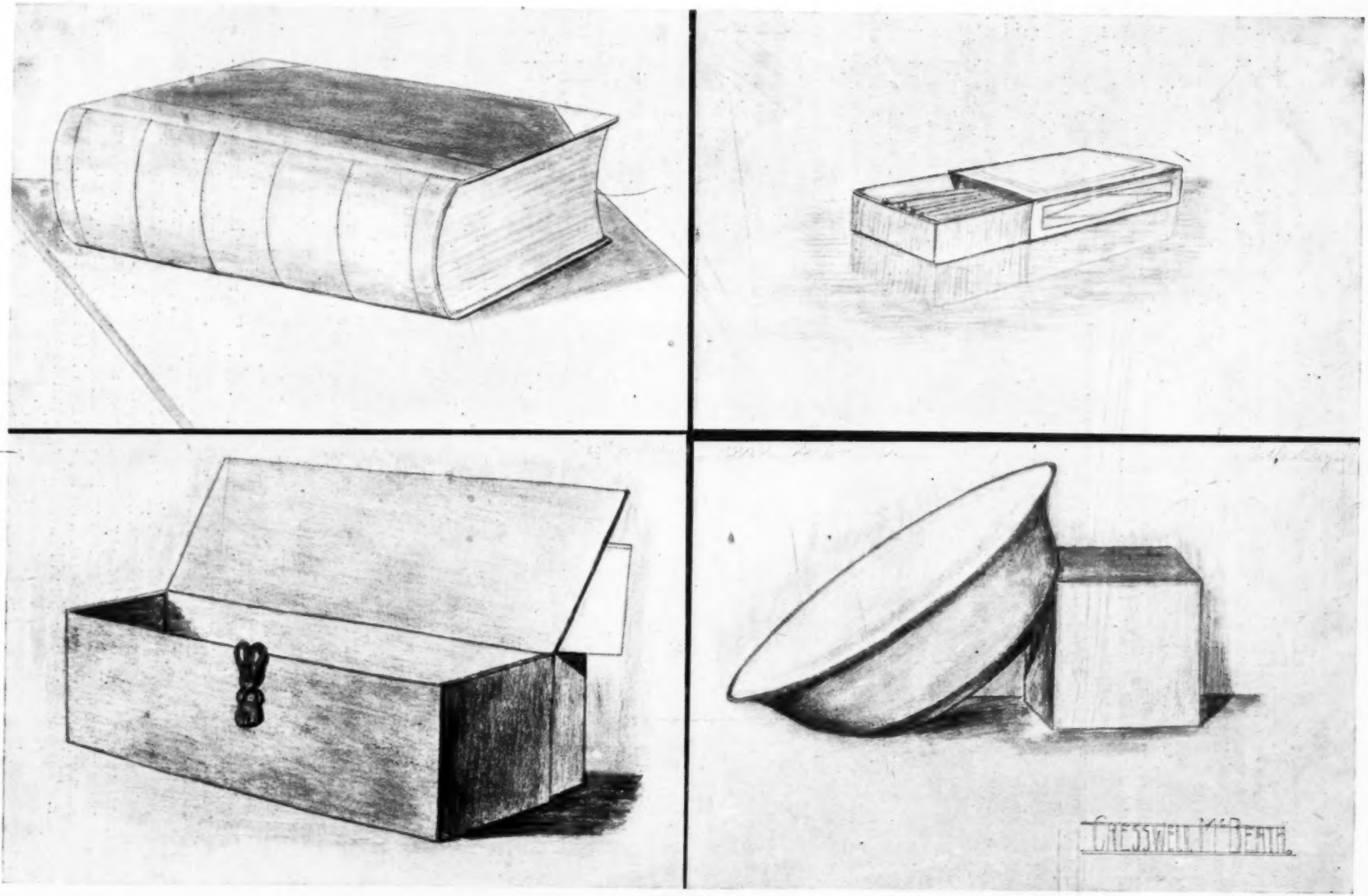


Fig. 1.

crayons, in which case the scale of the drawings can be considerably increased. Toned paper might also be used for those exercises where the pupils work from the middle of the scale towards the two extremes, instead of from white to black, as in pencil shading. Indeed, it is good to reverse this process entirely sometimes, and start work with white or coloured crayons on a paper which is altogether black.

Many teachers are in doubt as to whether geometrical models should be used in the study of light and shade.

FIG. 5.

The answer is yes, and no. For one who wishes to thoroughly understand and study cause and effect in light and shade, these models are very useful, but it must be admitted that for any other purpose they are rather tiresome and uninteresting. While making a careful selection of interesting common objects, it might be well for the teacher to have handy some type forms, diagrams, photographs, and finished drawings to illustrate important principles, as occasion for such explanations occurs. The ordinary boy or girl will have keener interest in drawing his or her own book, or a small box, than they would if the object is a square prism or board. The teaching involved is in each case the same; and if the study of the common objects is properly analysed and the application of principles explained, there is no need to spend time in actually doing the less interesting example. The safe path lies in the judicious use of both methods. Drawing from geometrical objects alone is stale and uninteresting, though it may be thorough as far as it goes; drawing from objects without due comparative analysis lacks principle, and may lead to confused ideas, loose work, and a want of grasp of the construction and essential features of the object studied. There is a lot to be learned from the shading of a cube, a cylinder, and a sphere; but there is no reason why the cube should not be a box or a parcel, the cylinder a common jelly-jar or a milk-pail, and the sphere one of the numerous forms of balls which boys and girls handle and become familiar with in their games. This makes the work more real, and at once connects it with the pupil's daily surroundings.

In the same way many teachers waste a tremendous amount of time and effort in trying to cultivate some particular style or mannerism in shading. These styles vary from line systems in all conceivable directions and combinations to the nebulous smudging produced by vigorous rubbing with a stump or piece of wash leather. All or any of these methods may become (in the hands of one who has already learned) a natural and satisfactory mode of work; but for the student who is searching for the truth and how to express it, the path of least resistance must be taken, and the studies produced in the easiest possible way, so as to leave him free to think about more important things. The mere rubbing backward and forward of a fairly soft pencil on good paper gives a fresh gray tone, which can easily be graded to represent the difference in light and shade seen upon the surfaces of things. It matters little what style is chosen; the only thing that counts is the correct adjustment of all the tones in the drawing in their true relation one to another. To keep the drawing crisp and clear, rubber should be sparingly used, and if errors are made they should be corrected by working over and round them with the pencil. The rubber in the hands of school children is apt to make things dirtier than before, and tear the skin from the paper to boot. The illustrations chosen for this paper are from drawings done by the senior pupils of elementary schools, or first-year boys and girls of a secondary school. Being selected from various schools, they show varied methods. In some the shading is treated lightly, though quite correct relatively, and in others it is bold, full-blooded, and, as near as possible, equal to the absolute depth of tone in the original. The models are simple in form and placed in easy positions. In the treatment of the drawings it might be noted that most of them, at least, suggest the surround-

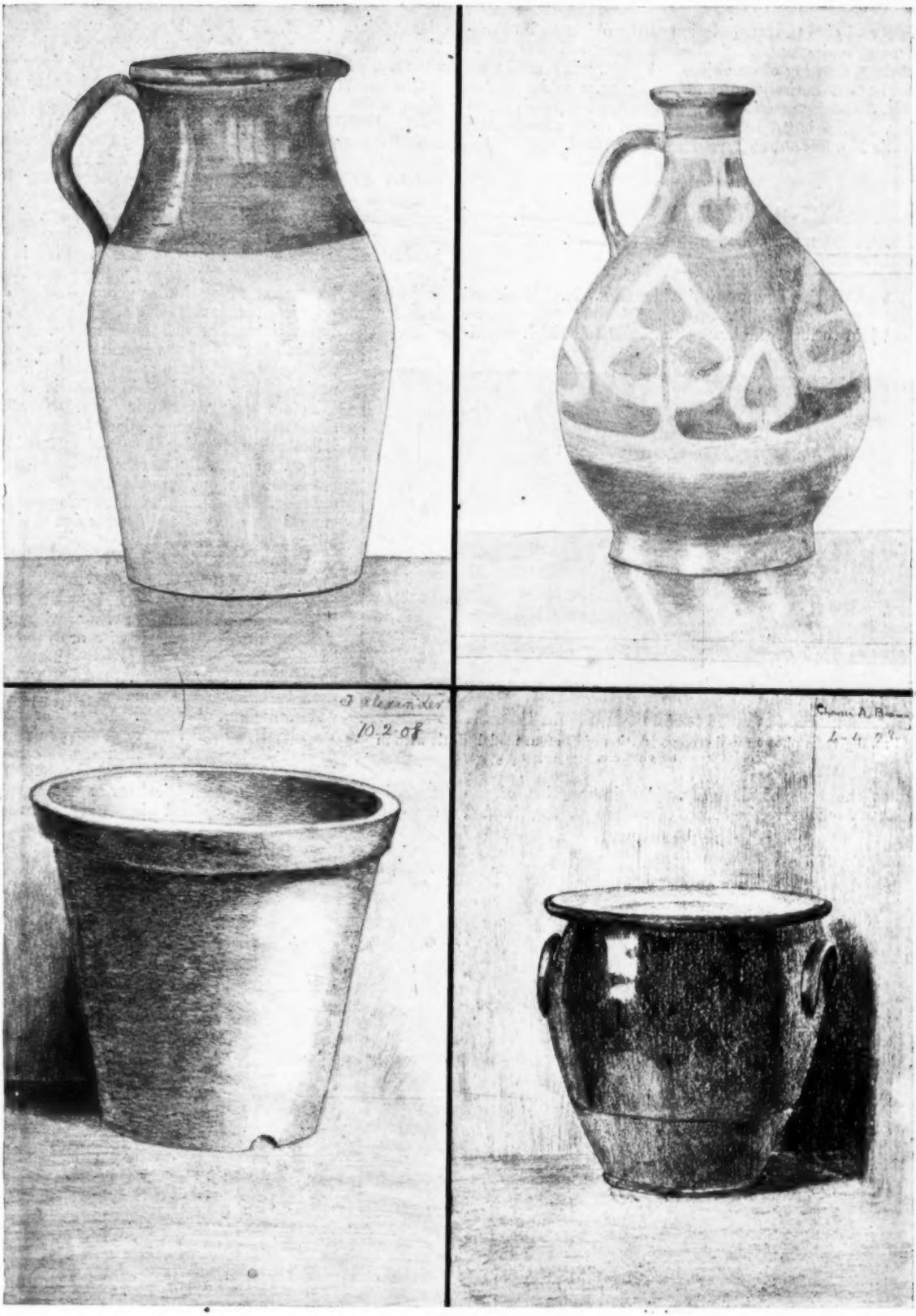


FIG. 2.

ings and give the true relation of the object to its background and ground. There is nothing which tends to make a drawing of an object look hard and unreal than to be left entirely surrounded by pure white paper. Fig. 3 shows the effect of a lightly shaded pencil drawing, Fig. 4 is on brown paper and done with chalks, while Fig. 5 is a drawing done with charcoal.

CARDBOARD MODELLING.

BY FELIX T. KINGSTON, BARRY.

Model 5.—A Tray.

DRAW the square, 5½″ side (Fig. 7). Mark off points A, B, P, Q, etc., 1¼″ from the corners, and join to form the inner square CDEF, which constitutes the base of the tray. The intersection of the diagonals will give the centre of a circle passing through eight points (A, B, P, Q, etc.) on the outer square. This circle, while providing the curves for the sides of the tray, serves as a test of the accuracy of the drawing.

The points G, H, etc., are obtained by trisecting the sight angles YFX, etc. Use the 60° set-square with ruler. If EF be taken as base, the four lines FG, FH, EK, EL may be drawn without moving the ruler, using the angle of 30° for the lines FG, EL, and the angle of 60° for FH, EK. If preferred, the children may be taught to do this with compasses instead, for there is no reason why the simple problem of trisecting a right angle by means of the compass should be relegated, as in old-fashioned syllabuses, to Standard V., when it is easy enough to be solved by much younger children. It will be evident that many similar geometrical problems may be correlated with this course.

Score the dotted lines. Cut out the figure roughly to within about ¼″ of the boundary lines, and then cut carefully along the thickened lines, noting precautions given in last article.

Before gluing, carefully bend the card along each of the scored lines to make the joints pliant, keeping the drawing outside. Spread glue thinly on the *inside* of the flaps—that is, on the side *opposite* to the drawing. After fixing and allowing to set, cut off the parts of the flaps which project above the edge of the tray.

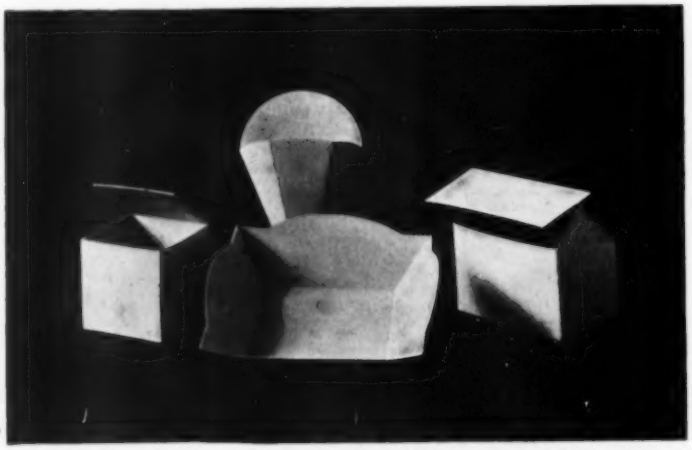


Fig. 6 gives a photographic representation of the four models dealt with in this article.

Model 6.—A Box.

A geometrical solid—the cube—is here introduced in the guise of a box with lid. Treated in this way, it is of more interest to the child than when regarded merely as an abstract type-form. Lead the children to observe the equality of its faces, edges, angles, diagonals. Let them previously, if possible, make a cube in clay, or draw its faces with the brush. Note here how much superior cardboard is to clay as a medium for expressing geometrical form. Plane surfaces and sharp, clean, well-defined edges and corners are

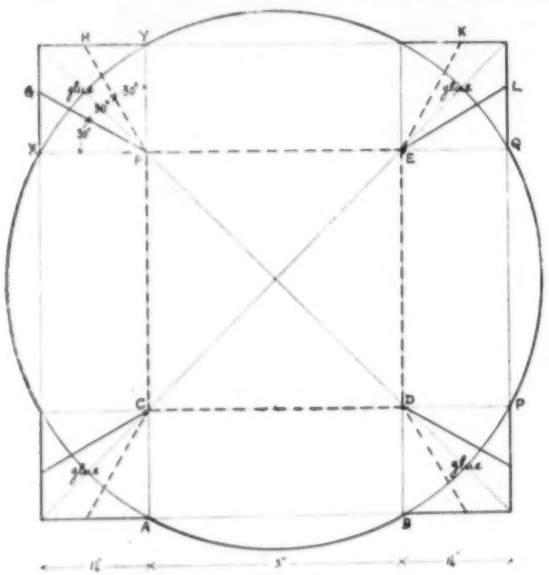


Fig. 7.

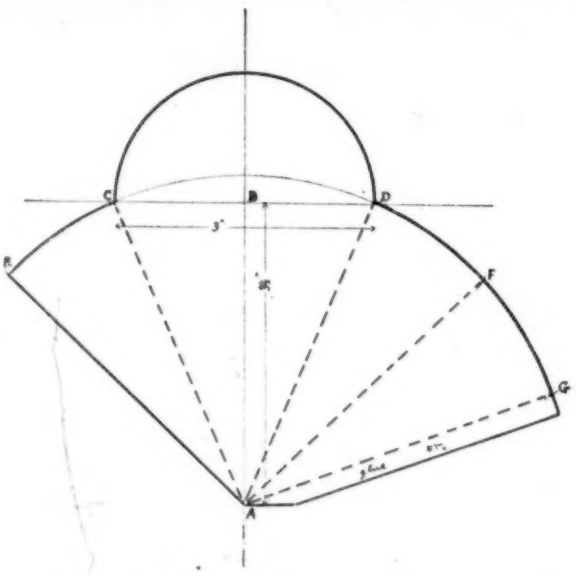


Fig. 9.

not possible in clay modelling. Observe also that the brush is inferior to both cardboard and clay, because solids can be represented by it only in the *flat*.

This model is one of those which lend themselves easily to the method of allowing children to make up the drawing from an examination of the model as suggested in Model 9 of the stage of juniors.

The measurements now for the first time involve eighths of an inch. Accuracy will perhaps be best obtained by first making a rectangle $8\frac{1}{2}'' \times 6\frac{3}{8}''$ and dividing it into twelve squares, each $1\frac{1}{8}''$ side, as shown (Fig. 8), discarding subsequently those which lie outside the thick lines. Add flaps $\frac{1}{4}''$ wide where indicated. Score the model before cutting out, because the ruler can be far more accurately placed along long lines than along short ones.

Glue and fix the flap marked A before gluing the others. All flaps should, when possible, be fixed *inside* models, out of sight.

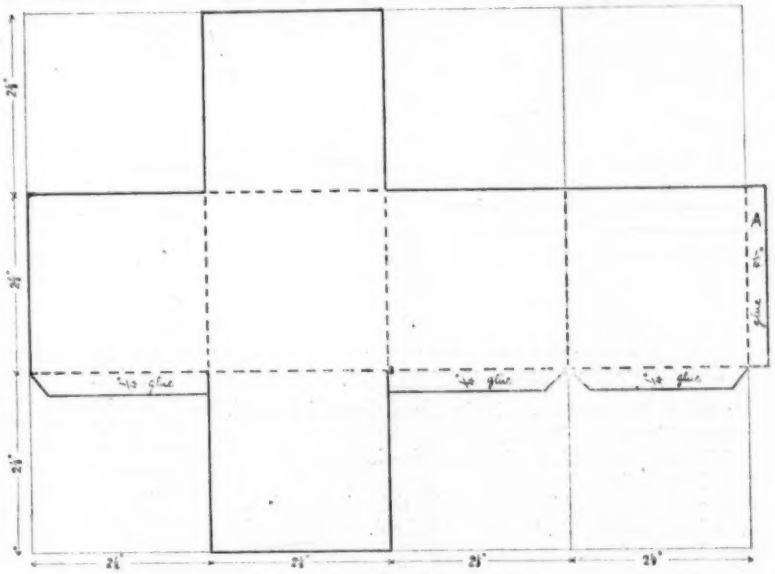


FIG. 8.

MODEL 7.—A TIDY.

The development (Fig. 9) is an example of those which can best be worked from a centre line. Having drawn two perpendicular lines of indefinite length intersecting at B, mark off BA $3\frac{1}{2}''$, and BC, BD each $1\frac{1}{2}''$. With centre A, radius AC or AD, draw the large arc of indefinite length. With centre B, radius $1\frac{1}{2}''$, draw the semicircle, and with same radius mark off CE, DF, FG. Join the points E, C, D, F, G to the point A. Add a flap either to AG or AE.

Errors in scoring are most liable to occur at A, where so many lines meet in a point. Furthermore, if the lines be scored to unequal depths, the model will be found to lose its symmetry when completed.

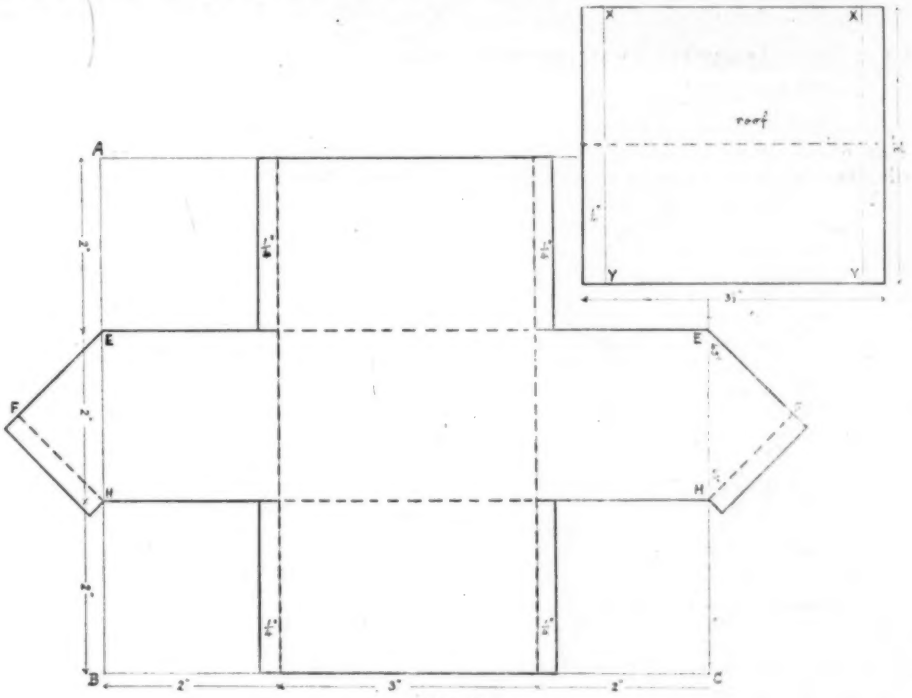


FIG. 10.

The tidy will prove of actual service in the home: Do not deprive the pupil of the pride of making it a gift to his mother.

Model 8.—An Ark.

Begin with the rectangle ABCD (Fig. 10), and subdivide—the method recommended in the case of Model 6. Next draw the lines EF, HF, using the 45° set-square. Score, cut out, and fix.

After completing this part of the ark, draw an oblong $3\frac{1}{2}'' \times 3\frac{1}{4}''$ (Fig. 10) for the roof. Draw the lines XY $\frac{1}{4}''$ from the short edges to assist in fixing it to the flaps. The lines XX, YY are now each 3" long, and equal to the length of the ark. The roof projects about $\frac{1}{4}''$ all round (see Fig. 6), while it is fastened to the ark only in two places, thus allowing one half to be raised.

The model may be made to synchronise with a spelling lesson involving names on animals.

HONOURS PAGE.

AWARDS FOR NOVEMBER.

1. Gilbert Richards (8), Bede Burn Council School, Jarrow-on-Tyne.

2. William Gill (12), Cathedral School, Great Charles Street, Birmingham.

3. Eva Mann (13), Thorpe Hamlet School, Norwich.

4. Albert Lacey (13), Cathedral School, Great Charles Street, Birmingham.

We have tried the experiment of reproducing the drawings to a slightly larger scale this month. It reduces the number of examples, but gives a better idea of the originals. Drawings are steadily being received, but there are still many important places, where we know good work is done, that have sent nothing.

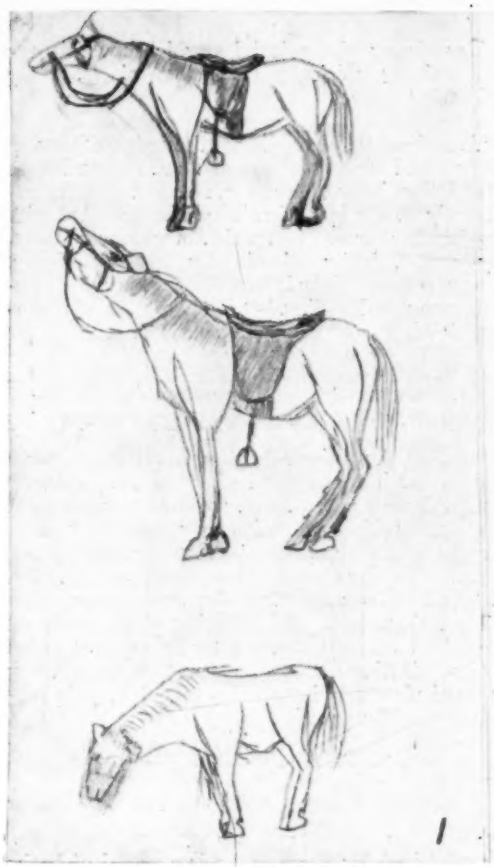
CRYSTALS FROM THE CONGRESS PAPERS.

THERE is no other country in Europe where so little money is expended in the cause of the arts generally as in England. The attitude of the Universities of Oxford and Cambridge has been so full of prejudice that they have been slow to answer the demands which relate to the progress of music, the drama, and the graphic arts. It is true that there is a professor of music, a Slade professor of the fine arts, and a professor of archæology; but the general tone of the university is rather to accept these subjects as incidental, and perhaps deplore a little that they are even incidental. So far, excepting in the case of students with a very distinct bias in the direction of such studies, by far the greater number of undergraduates leave the universities as ignorant of the place the arts have occupied in ancient and modern history as they were when they left school. It is to be doubted if the practical teaching of the graphic arts will ever assume a place proportionate to their value in any university, yet the history of art might be taught as an integral and indispensable part of education—the history of the arts of Egypt, Assyria, Greece, Italy, France, and England. It is a truism to state that the history of Egypt would be unknown to us save for its art; that Assyria has given us through its art the history of its kings, and to a large extent the history of its civilisation. The place that art took in Greece everybody knows; the influence of the arts on the grandeur of the Italian States can hardly be exaggerated. In France it not only was but is considered to be a natural and necessary form of culture; and our own English history proves to us, not only by the cathedrals, but elsewhere, that the graphic arts were practised and encouraged in England up to the time of Henry the Fourth, and crafts, bearing as noble a record as those produced in Italy, at the same period and even later.

Let us for a moment consider what a good teacher should be—indeed, what he must be—before he is fit to assume a mastership in cities, country towns, or in the manufacturing districts. He must be equipped with a wide range of knowledge; he must be able to handle many crafts; he must understand the limitations of the materials employed in them; he must be wise and sympathetic enough to encourage local industries, applying severest tests to each and all of them, from pottery to lace designs, from printing patterns on fabrics to construction of buildings, sculpture, and decoration, according to the various restrictions imposed by environment and local necessities. That the curriculum now being followed at South Kensington is more favourable than it was to answer such demands is undoubted, but the difficulty remains that the manufacturers are not sufficiently educated in good taste to recognise the difference between good and bad design; hence they, being employers, are more likely to mislead than to direct the taste of the public. So the whole thing runs in one continuous chain, the first link of which seems to be weak, that link which should ally beauty with the essential. It follows, then, that before the manufacturers can make use of the best designs, they must know what the best is—an apparently impossible circumstance in the hurry of the race for wealth, predominantly the vice of what we call modern civilisation. Cheap and bad design and ornament is worse than none at all.

When a student can draw and understand the movements of the human frame, he will be able to draw anything from a plant to a tiger; he will soon learn by analogy. If he is not a master of the human frame, the chances are that all his drawings will be empirical. I wish to lay stress upon this, because we are told by many irresponsible critics that good drawing is "banal," that the boundaries of atmosphere are non-existent, as well as other jargon which incites students to idleness and tends to degeneration. Art is more than a pleasant occupation for odd moments; it is a difficult science.

We English as a race have, I think, a more natural taste for colour than for form. It is our weak point, then, that we should develop; and somehow there is a sort of lurking prejudice against any teaching upon a scientific basis—it is anti-English. There is too much stress laid upon what is called genius; there is too much hard hitting against academical training—indeed, a kind of anarchical feeling is being bred against all forms of intellectual discipline. Without intellectual discipline no one can become a real artist. Hence anatomy and the study of the human frame are being woefully neglected, and the drawings annually sent up for competition are not so good as they were; they are not so serious, and not so intelligent. It is very easy to make a flourish and to produce an effect quite misleading to those who have untrained eyes, but it is extremely difficult to draw scientifically or even intelligently, unaffectedly, and with absolute sincerity, without "bluff;" and it is that which should be encour-



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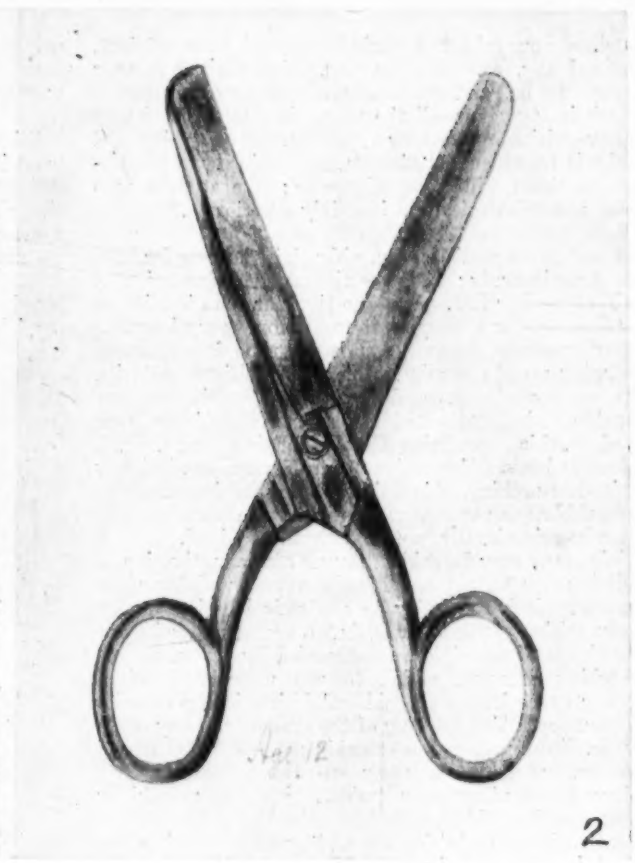

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aged. In our schools I would have much more efficient, again I say, scientific drawing, hard though it may appear to be, and much less of the clever sketching which is at present all the vogue in every school that I have visited. We may depend upon one thing and make it an axiom: "The student trained upon scientific methods will always improve; the student who relies upon dexterity will infallibly deteriorate."

Short cuts are misleading. Youth is the time for hard and drastic study; it is the time for the formation of habits, good or bad. It is the time for the direction of enthusiasm, for conveying it from momentary impulses into permanent channels; it is the time for strenuous stringing up of the mind while the faculties are docile, the energy strong, and impulsive experiments are capable of being directed into principles. There is no good teaching excepting that which is founded on a scientific basis. To cultivate only enthusiasm is likely to lead to nothing. To follow passing fashions must be a deathblow to permanent progress. Therefore teachers must be scientifically, not ephemerally, trained.

Whatever may be said in favour of the cultivation of individuality should not dismiss severe training upon an academical basis. By an academical basis I do not mean tricks or mannerisms, but a sound and scientific knowledge of principles, accompanied by strenuous and searching drawing, which to the uninitiated might appear to be hard and cold. This implies an exercise in accuracy. The learning of the grammar of any art—music, literature, or the graphic arts—may be a dull process, but it is absolutely essential to final success. I have seen student after student, with plenty of ability of an emotional kind, with ideas also either borrowed—and that is not to be deprecated in youth—or original—which is rare—entirely unable to express them with any style, because the grammar of style had not been acquired at the time when the hand and eye were most ductile. The faults discoverable in the works which are sent up for annual competition, the faults which are most prominent, are absence of style, inaccuracy of statement, and a general slovenliness of execution wholly to be deplored in the work of a student. If such faults can be shown by analogy, it is as if a schoolboy or an undergraduate of a university was to send up a paper to his examiners full of grammatical errors and ill-spelt. I doubt if such would be likely to obtain for the student the mastership in any school.

No man is cleverer for being ignorant, and no artist will ever be able really to express what he has in him unless the foundations of his education are well and securely laid. It is perfectly true that the school of Ingres produced artists who, as they found their own *ego*, deviated from the methods which they had learnt under that master; but I question if any single one of them would tell us that the hard drilling in drawing given to them by Ingres was waste of time, any more than the most modern of musicians would rebel against contrapuntal formulæ which he studied from the old masters in his youth. Drawing can be taught, style can be learned, by constant study of the great masters; good taste can be inculcated. Genius can be provided with means to express its yearnings, and the public can be educated by keeping constantly the best examples of any art before it. We are but poor judges of what our own time is doing, we cannot say whether it will die or live; we have the great art of the past to guide us, and we know the principles which underlie the technical training which produced masterpieces. They were scientific!

Stimulate the general public to discriminate between what is true and what is false in art, and the student to understand that before he can run he must walk, and that the only means by which he can be provided with a successful after-career as an artist, in whatever branch he may choose, is by scientifically, not empirically, mastering the most difficult art of drawing with combined accuracy and feeling.—"*The Teaching of Drawing*," *by Sir W. B. Richmond, K.C.B., R.A.*

SCHOOL OF ART WOOD-CARVING.

THE School of Art Wood-Carving, Exhibition Road, Kensington, has been reopened after the usual summer vacation, and we are requested to state that some of the free studentships maintained by means of funds granted to the school by the London County Council are vacant. The day classes of the school are held from 10 to 1 and 2 to 5 on five days of the week, and from 10 to 1 on Saturdays. The evening class meets on three evenings a week and on Saturday afternoons. Forms of application for the free studentships and any further particulars relating to the school may be obtained from the Manager.

Sloyd for the Three Upper Grammar Grades. By Gustaf Larsson. (*G. H. Ellis and Co., Boston.*)

Our good friend Mr. Larsson sends a parcel of books dealing with sloyd. Wherever sloyd is known Mr. Larsson is recognised as an ardent and enthusiastic supporter and teacher. The account of his work in Mysore is most interesting, and it is cheering to know that his mission to India was so successful. The title of the text-book shows that it was compiled primarily for American schools; but, of course, the principles laid down are applicable to all countries. He sums up the whole problem when he writes, "Sloyd has never stood for any standard set of models," although it has sometimes been so interpreted. On the contrary, sloyd principles call for the constant study of existing needs, and a readiness to adapt models, tools, and materials to varying conditions.

The terse opening chapters of the book are excellent in every way, and will well repay very careful study, while the models show pleasing variety and originality.

Longman's Complete Drawing Course. Part II. By J. H. Morris.

Mr. Morris is well known for the interest he has long taken in the teaching of drawing in elementary schools. He has brought his long experience to bear on the production of this book. The work suggested is just what can be reasonably and successfully attempted in ordinary schools. A most comprehensive and extensive series of illustrations shows the methods of dealing with natural forms and their application to pattern work, the principles underlying the drawing of common objects, and the mechanical drawing suitable for the upper classes. Teachers will find the book brimful of useful suggestions.

COMMON-SENSE HINTS ON THE TEACHING OF ARITHMETIC.

BY AN INSPECTOR OF SCHOOLS.

(*Continued from page 101.*)

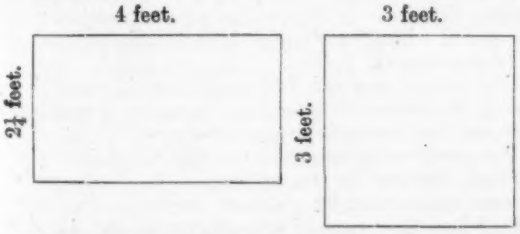
IN some schools the question arises as to when mensuration—or perhaps, to denominate it more accurately, "a knowledge of areas"—should commence. I find it is generally left till Standard VI. is reached, although there are some few cases where it is started in Standard V.

Now I advocate its introduction at an earlier stage, at the lowest in Standard IV. And the question naturally occurs as to the manner of its introduction. I think it might be commenced thus. A child is supposed in Standard IV. to know something of square measure. He has had, or should have had, a diagram proving that a rectangle 3 feet long and 3 feet broad contains 9 square feet, and this should have been followed up by the child gathering from his own drawing that a rectangle of 4 feet by 4 feet contains 16 square feet, and one 5 feet by 5 feet 25 square feet. The next step will be to prove that a room 12 feet long by 10 feet broad has an area of 120 square feet, and a diagram will be requisitioned to convince the class of this. Sketches may now be drawn to show that a room or passage of these different dimensions has the same area—namely, 120 square feet:—

15 feet by 8 feet,
24 feet by 5 feet,
20 feet by 6 feet,
40 feet by 3 feet,
30 feet by 4 feet,
60 feet by 2 feet,
and even 80 feet by 1½ feet.

Such exercises will provide good practice in mental arithmetic, and lay a foundation for *factorising*—a very essential point in arithmetic, too often passed over, and yet extremely valuable as a prelude to algebra in the upper part of the school. Time will, of course, be taken up in the drawing of these different diagrams—and, some teachers may think, too much time—but the result will prove that it is not wasted time, as the children will have grasped what length multiplied by breadth really means—a not too frequent experience of an examiner, and yet the very foundation of mensuration.

The children should then be able to state the difference between a *square yard* and a *yard square*, and the following diagrams, drawn to scale, will bring this difference home:—



I have frequently asked this question, and have rarely received a correct answer; and I must confess some teachers have questioned the accuracy of my conclusion till demonstration has removed all doubt. "If it takes 4 square yards of material to make an outfit for a girl, how many square yards will it take to make one for her mother, who is twice her size?" The correct answer is, of course, 16 square yards, but the invariable one is 8 square yards, arising from the thought that the double of 4 is 8. A diagram settles the question at once. A square of 2-feet side has an area of 4 square feet, but a square of 4-feet sides has an area of 16 square feet, which is four times the area of the first square.

And now allow me to digress for a moment in the direction of urging the importance of this subject of mensuration for girls. Some teachers seem to think it is the peculiar privilege of boys; but no girl should leave the higher classes of a school without being able to arrive at an accurate estimate of how much paper it would take to cover the four walls of a room, or how much carpet it would require to cover the floor.

And here I want to give a "common-sense hint" as regards finding the number of *square yards* in a room so many feet long and so many feet broad.

This is the common practice. To find the area in square yards of a room 27 feet long by 16 feet broad, 27 is multiplied by 16 and the product divided by 9. Thus:—

$$\begin{array}{r} 27 \\ 16 \\ \hline 162 \\ 27 \\ \hline 9)432 \\ \hline 48 \end{array}$$

The children should be shown that if they can divide by 9 before multiplying, the result will be the same, and obtained with greater ease and accuracy. Thus $27 \div 9 = 3$, and $3 \times 16 = 48$.

And again, "A room is 15 feet long by 12 feet broad. How many square yards does it contain?" will not be worked thus: $\frac{15 \times 12}{9}$, but the 15 and 12 can be divided by 9 thus: $\frac{5}{\cancel{15}} \times \frac{4}{\cancel{12}}$, and the answer, 20 square yards, obtained.

Of course, in finding how many square feet a rectangle so many inches long and so many inches broad contains, the same principle will be applied.

Thus, "A piece of calico is 72 inches long and 48 inches broad. What is its area in square feet?" will be worked thus: $72 \div 12 = 6$, and $48 \div 12 = 4$. Therefore the answer is 4×6, or 24 square feet—a much simpler way than that reached by multiplying 72 by 48 and dividing the product by 144. I remember demonstrating these examples in an evening school attended by grown-up men, and I shall not soon forget the smile of appreciation which came over their faces when they perceived the superiority and simplicity of one method as compared with the other.

And to add interest to the teaching, and to make it more practical and business-like, *cost* should come in. For realising what is *wanted in area* is not realising what is *wanted in cost*—a perhaps even more important item than the former. And how readily does this question of *cost* lend itself to the weaving of the mental question with the written—a process I have pleaded for throughout these articles. Take our first room of 12 feet by 10 feet, or 120 square feet. A series of questions will follow thus:—

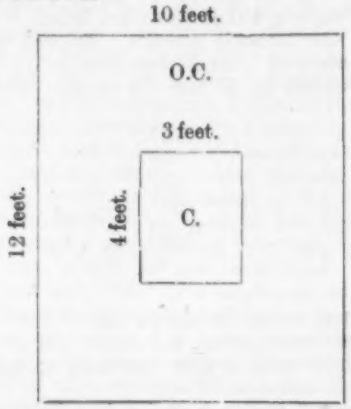
What would be the cost of carpeting the room at 3s. 4d. a square foot? Ans. £20.

What would be the cost of carpeting the room at 1s. 8d. a square foot? Ans. £10.

What would be the cost of carpeting the room at 6s. (3s. 4d. + 1s. 8d. = 6s.) a square foot? Ans. £30.

And this might be still further pursued by requiring the cost of carpeting at the same price per square yard, which simply means the division by 9 of the answers previously obtained.

And again, proportion—or rather *ratio*—might be worked in with this example. A few mental questions must first be asked, thus: One room is 12 square feet in area, another is 6 square feet in area; what is the ratio of the smaller room to the larger? The scholars will easily be led to see that as one is twice the area of the other, the ratio of one area to the other is 1 : 2; and again, that if one room has an area of 12 square feet and another 4 square feet, the ratio of one area to the other is 1 : 3.



Now let us return to our original room—12 feet by 10 feet—and we will put this question on the blackboard: "Suppose that in the centre of the room a carpet 4 feet by 3 feet is laid down, and the remainder of the room covered with oilcloth, what will be the cost of the oilcloth at 9d. a square foot, and the carpet at 2s. 3d. a square foot, and what ratio does the carpet required bear to the oilcloth required?"

This example will, as the numbers to be dealt with are small, be worked mentally.

Thus 120 − 12, or 108, at 9d. = ¾ of 108s. = 81s.—cost of oilcloth.

Twelve at 2s. 3d. = 27s.—cost of carpet.

Therefore total cost of covering equals 108s., or £5, 8s.

Now as regards the ratio the carpet bears to the oilcloth. A common practice is to find it in this way:—

Area of oilcloth is 120 − 12 square feet = 108 square feet. Area of carpet equals 12 square feet. Therefore ratio is 12 : 108—that is, 1 : 9.

Another way in which it can be obtained, and perhaps a better, is this: The question is put, "How many pieces of carpet would cover the room?" The answer is, of course, 10. The children will be then led to see that if it takes 10 pieces to cover the room, and only one of them is carpet, it will require 9 pieces of oilcloth to complete the covering; and therefore the ratio is 1 : 9.

I set this question to the upper class of a school: "A room is 15 feet by 10 feet. It contains in the centre a piece of carpet 5 feet by 3 feet. The rest is covered with oilcloth. Find the ratio of the carpet to the oilcloth." It was generally worked thus:—

$$\frac{1\frac{1}{2} \times 10}{\frac{1}{2} \times \frac{1}{2}} = 10.$$

and the wrong ratio stated thus—1 : 10. The children were led to see the error in this way. As only 10 pieces of material of the same area as the carpet were required to cover the room, and one piece was carpet, the remaining 9 must be oilcloth. Therefore the ratio is 1 : 9. If the ratio were as they obtained—1 : 10—it would take 11 pieces, and not 10, to cover the room.

Of course much practice will be given in deducing from a given area and a given side the length of the remaining side, and in these exercises factorising will form a prominent part.

MODERN SCIENCE NOTES.

BY J. G. M'INTOSH, SECONDARY SCHOOL, GATESHEAD.

Electricity and Plant Life.

SIR OLIVER LODGE not long ago published the results of an interesting number of experiments on the application of electricity to plant culture. These experiments continue on a larger scale the pioneer research of Professor Lemström made some thirty years ago in Norway and Sweden.

The work has been undertaken on the farm of Mr. R. Bomford at Salford Priors, under the immediate direction of Mr. Lionel Lodge.

The general method, as detailed by Sir Oliver Lodge, was to stretch over the field a number of wires or poles, something like low telegraph wires, but high enough to allow the usual farming operations to be easily conducted underneath.

These wires, which were quite thin, were supported by a few posts in long parallel spans about thirty feet apart, one pole per acre being enough, and the area under electrical control being nineteen acres. The wires were further supported by elaborate high-tension insulators.

The system of conductors was then connected to one point, with a generator supplying a charge with a positive potential of about a hundred thousand volts, and maintained at this potential.

In Sir Oliver Lodge's words: "Leakage immediately begins, and the charge fizzes off from the wires with a sound which is sometimes audible, and with a glow which is just visible in the dark. Any one walking about below the wires can sometimes feel the effect on the hair of the head, as of a cobweb on the face. They are then feeling the stimulating action of the electrification."

This effect is maintained for some hours each day and shut off at night. Probably it is only best applied during the time of the plant's greatest activity, but the period when the stimulus is most effective has yet to be determined.

The power required for generation is small; for though the potential is high, the quantity is small, and therefore the energy is comparatively trivial.

The power was generated by a 2 h.p. oil-engine driving a small dynamo in an outhouse. From thence the current was carried by ordinary overhead wires to the field, where they entered a weatherproof hut, in which was the transforming and rectifying apparatus.

The transformer was a large induction coil, specially made to stand continuous use, and its current was then rectified by means of vacuum valves in accordance with a patent device invented by Sir Oliver.

The negative charge was earthed, while a positive high-tension charge was led by a specially insulated conductor

to the nearest point of the overhead insulated wires, which are maintained at this high potential.

The overhead system covered 19½ acres. The wires were mounted on poles 15 feet high, placed in rows 102 yards apart, the poles in each row being 71 yards apart.

Telegraph wire carried the current down each row, while thin galvanised iron wires, placed some 12 yards apart, were stretched between the rows as discharge wires.

In this way 22 poles were needed to support the wires over the 19 acres. Owing to the flexible suspension, the risk of breakage is very small.

The actual results obtained in 1906–1907 are in themselves sufficiently striking to warrant an optimistic view.

Canadian Red Fife wheat electrified showed an increase of 39 per cent., and English White Queen 29 per cent., with a corresponding increase in the quality of the straw.

The electrified wheat brought 7½ per cent. more in market price, and baking tests showed an average of dry glutens in the electrified of 11·15 per cent., as compared with 10·25 per cent. in the unelectrified.

In 1907 a wheat test gave 41·4 bushels per acre electrified as against 32 unelectrified, and the electrified wheat was superior.

Strawberries showed a 35 per cent. increase and earlier ripening; mangolds gave an increase of 25 per cent., and more sugar.

On the whole the experiments give promise of great agricultural developments, and further results will be awaited with much interest.

The Liquefaction of Helium.

In a recent issue of *Nature*, Mr. F. Hyndman contributed an account of the successful liquefaction of helium by Professor H. K. Onnes of the University of Leyden, and submitted by him to the Royal Academy of Amsterdam.

Professor Onnes first determined the isothermals of helium, particularly those at temperatures which could be obtained only by the use of liquid hydrogen.

From these he was able to determine that the temperature at which p.v. is a minimum, in the case of helium lies somewhere about the lowest temperatures obtainable by hydrogen, and that therefore the processes of Linde and Hampson as applied to air, and Dewar to hydrogen, were likely to be applied successfully to the liquefaction of helium.

As a result of these experiments it was shown that the Boyle point was about 15° K., which is obtainable by liquid hydrogen at reduced pressures.

The actual apparatus used is simple in principle. "The regenerator spiral, through which the compressed helium is expanded, is contained in the upper part of a vacuum glass also containing, lower down, the upper bulb of a helium thermometer. The helium glass is contained in a second, which is filled with liquid hydrogen and connected to the hydrogen circulation. This glass in turn is contained in another filled with liquid air, and this finally in one containing alcohol. All these glasses were unsilvered, so that a clear view is obtained of the central glass and its contents."

Seventy-five litres of liquid air were first obtained, and from these twenty litres of liquid hydrogen. The description of the actual operations, as detailed by Mr. Hyndman, is as follows:—

"At 2.30 p.m. on July 10, hydrogen cooled by liquid air was taken through the hydrogen glass, and by 3 p.m. the temperature was down to − 180° C. At 4.20 the helium circulation was started, liquid hydrogen was introduced into its glass, and the pressure lowered until at 5.20 p.m. it reached 6 cm., at which it was kept.

"Between 5.30 and 6.30 the pressure of helium in the spiral was gradually raised to 100 atmospheres. At 6.35, when the pressure was allowed to fall rapidly to 40 atmospheres, the helium thermometer indicated a temperature below that of the liquid hydrogen. About 7.30 the surface was seen at the top of the vacuum glass, and had the appearance of a liquid near the critical state.

"Some of the evaporated helium was collected, and gave a density of 2·01. At 8.30 the pressure on the helium was reduced, and 2·3 cms. measured. At 9.40 only a few c.c. of liquid helium remained.

"Thus liquid helium had been under observation for more than two hours."

The following properties were found:—

A boiling-point of 4·3° K. on a constant volume helium thermometer with a pressure of 1 atmosphere at about 20° K.

Liquid helium has a density of 0·15, which gives a value to the b of Van Der Waal's theory of 0·00017. At the boiling-point the ratio of vapour to liquid density is 1 : 11, which shows a temperature of about 5° K. and a critical pressure of 2·3 atmospheres.

The Neglect of Mathematics.

Professor G. H. Bryan, F.R.S., contributed to a recent number of the *Cornhill Magazine* an article on "England's Neglect of Mathematics," in which he gave several instances of the value of mathematical research. For example, he points out the many losses of lives and ships sustained before the mathematical theory of stability was worked out. "If," he says, "one-tenth of the money expended in building these ill-fated ships had been offered to a really competent mathematician possessing the highest knowledge of his subject, to enable him to devote his whole time for a year or so to this particular problem, the saving to the community would have been immense."

We hope that Professor Bryan's article may do something to awake the British nation to a sense of its duties, but we confess to feeling somewhat sceptical. The characteristic of the British nation, we have it on eminent authority, is to "muddle through."

At the same time, the universities may do a great deal by remodelling their matriculation examination syllabuses in mathematics. We observe a gradually increasing tendency among secondary schools to adopt the matriculation examination of a university as a kind of leaving certificate. The consequence of this policy is that third and fourth year students at the present time largely mark time in their mathematical studies, and limit their attainments to covering this syllabus. We know at least one institution in which the study of trigonometry has been entirely dropped because it is outside the syllabus of the University of London matriculation.

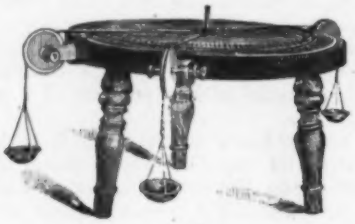
A knowledge of geometrical and analytical conics and of the calculus ought at least to be demanded from the fourth-year student. The former provides interesting exercise in the ordinary theorems of geometry, while the applications and illustrations of calculus

methods which may be provided by a well-regulated course in physics render the neglect of this branch as an educational study positively criminal.

A decade has passed since Professor Perry first began his crusade on behalf of rational mathematical teaching. It would be interesting to try to estimate its influence up to the present; but to-day, as yesterday, our universities still adhere to old traditions, and are content to "muddle through."

A Piece of Apparatus for Teaching the Triangle and Parallelogram of Forces.

Most pieces of apparatus used for teaching children the principle of the triangle of forces and the parallelogram of forces labour under the disability that the student has little or no control over the angles between the forces. Such a problem as to practically find the resultant of two given forces at a given angle cannot be solved.



The above piece of apparatus surmounts this difficulty. A mahogany table of about twelve inches diameter has fixed on the top a circular protractor. Three aluminium pulleys mounted on brass supports can be moved in a circular groove cut on the top of the table. Cords are attached to a small ring fitting loosely over the centre pin. Two of these cords may be adjusted to any angle and forces applied. The equilibrant may then be determined by sliding the third pulley round the groove and adjusting weights until the ring is centred over the pin.

The apparatus, which is extremely useful with junior classes, may be obtained from Messrs. Brady and Martin, Northumberland Road, Newcastle-on-Tyne.

An Experimental Transformer.

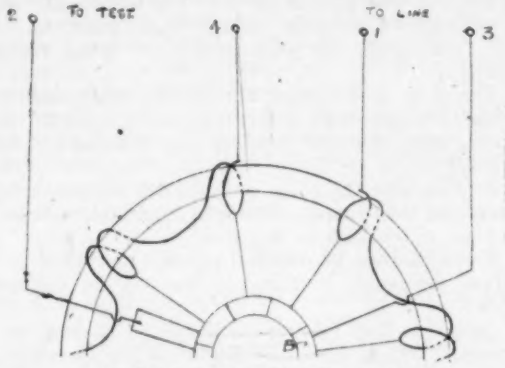
In the *Electrical World* Mr. G. T. Hanchett describes a method of obtaining a convenient experimental transformer which should prove useful in many laboratories. An old gramme ring armature is utilised for the purpose, and may be obtained at comparatively little cost in any second-hand shop.

Cut out every other bar of the ring by disconnecting them from the armature, cutting off the loose ends, soldering them together, and taping them up. Open the armature circuit at a point, and bring out the leads to two binding posts mounted on a suitable panel.

Select a bar B (see diagram), and bring that out to a third binding post.

Next remove one brush-holder, and equip the other with a gauze brush the width of one bar, and by means of a flexible terminal bring that out also to a fourth binding post on the panel. This completes the transformer.

If a constant PD be applied to 1 and 3, a variable PD may be obtained from 1 and 4 by simply swinging the brush round the commutator. The maximum voltage of this variable PD will of course depend upon where B is located, as well as the PD applied to 1 and 3.



An Experimental Transformer.

For the sake of simplicity in reproduction, the coils and commutator segments have been considerably reduced in number.

An easy experimental method of determining the best position of B is to construct the transformer as above, omitting the connection of the bar B. Connect the constant PD to 1 and 2, and see that the brush rests upon the bar leading to 4.

As the brush is now advanced round the commutator, the turns to which the constant voltage is applied become less and the magnetising current greater. A point will be found at which the iron in the armature begins to hum, and beyond this point it is inadvisable to go. This should be selected as the point of application of B.

It will be wise to remove the band wires on the armature to avoid eddy currents.

GEOGRAPHY NOTES UP-TO-DATE.

BY E. R. WETHEY, M.A., F.R.G.S.

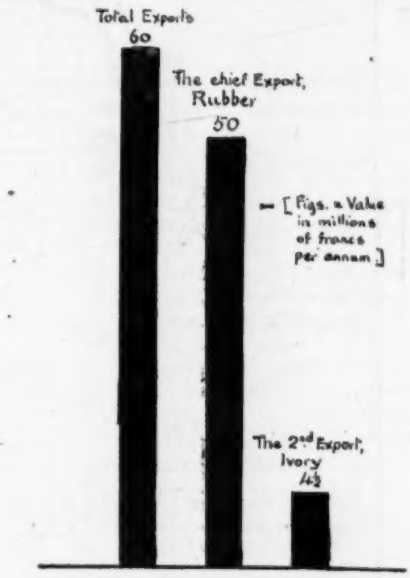
Exit the Independent State of the Congo!

THE recent decision of the Belgian Parliament to annex the Congo State is, of course, what every one expected, but it removes a curious anomaly from the political map of the world. For more than twenty years the so-called "Free" State has posed as independent, while it has really been administered as if it were a colony. Its origin was the direct outcome of the zeal and fervour roused by the work of explorers—of Livingstone, who first discovered the "Congo system" in his journeys of 1866–1873; of Cameron, who found out the "Tanganyika outlet," 1873–1876; but, above all, of Stanley, who by his famous voyage of 1876, right down the river to the Atlantic, first settled the question where and whence the mighty Zaire derived the enormous volume of its waters. Within ten years from his discovery, what was to all intents and purposes the basin of the river emerged as a sovereign state under King Leopold the Second of Belgium (who had practically borne all the expenses from the beginning) as its sovereign, and guaranteed in its independence by the various approving Powers of Europe and by the United States. That was in 1884 and 1885. The connection with Belgium was "personal" only, though the obvious end was foreshadowed by the Agreement of 1890, when Bel-

gium was conceded the right of annexing the State, if it liked, after a period of ten years. A further period of deliberation, in which the "Mother Country" or "Father Sovereign" might make up their minds, was re-enacted in 1901; and now in 1908 the deed is done. True, all the conditions are not settled as yet, but for the future the Congo State will be under responsible government. Formerly, King Leopold the Second, as a constitutional monarch, could not be called to account—"the king can do no wrong"—nor, as an absolute ruler, had he any Ministers who could be made responsible. A secure position for himself, if a trifle unsatisfactory from the point of view of his African subjects, on whose land he had never, nor was ever likely to, set foot. This state of affairs is ended—not before time, as many people think. It is interesting to remember that by the "General Act" of 1885, passed by the Great Powers in conference assembled at Berlin, there were instituted free trade in the Congo basin, free navigation of the Congo waters, protection of the natives, and suppression of the slave trade throughout the Congo dominions. How far these "institutions" have progressed is a thorny subject. As early as 1890 it was discovered necessary—and allowed by another meeting of the Great Powers, this time in conference assembled at Brussels—that certain duties should be imposed on imports, while the protection of the natives has followed curious lines in later years. But these are politics, and schoolmasters have no politics. Apart from this, the new State has its own special difficulties to contend with. The main entrance to it is hemmed in with obstacles. A glance at the physical map shows how naturally barred with rapids is the Congo mouth, while the political map, in the relative positions taken up by French Congo and Portuguese West Africa, completes the barrier.

The Congo's Present Condition and Future Prospects.

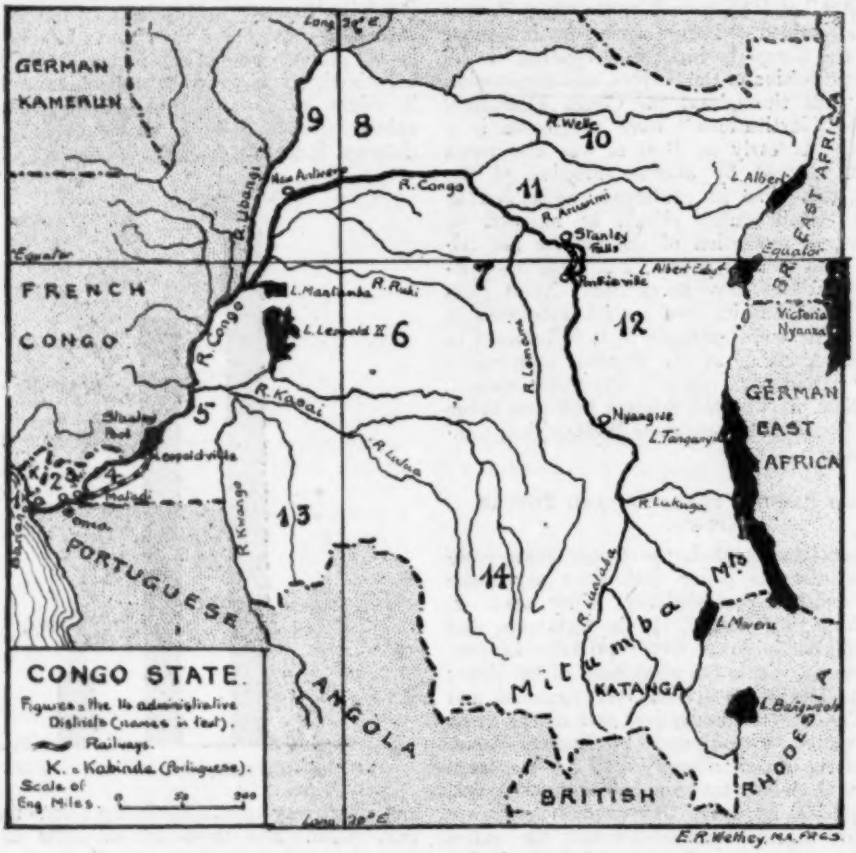
As at present administered, the Congo State comprises fourteen districts (some authorities say "sixteen"), each under a commissioner. They are: (1) Banana, (2) Boma, (3) Matadi, (4) the Cataracts, and (5) Stanley Pool, on the lower river; (6) Lake Leopold II. and (7) Equator, within the great bend of the river; (8) Bangala, (9) Ubangi, (10) Welle, (11) Aruwimi, and (12) Stanley Falls, to the north and east of the great bend; (13) Kwango Oriental, and (14) Lualaba-Kasai, to the south of the Kasai tributary system. Scattered about amongst them are between 500 and 600 posts, at which some 1,500 European Government agents are stationed. These agents form about half the entire white population on an area of nearly 1,000,000 square miles, not very far off one hundred times as large as Belgium! The "black" population can only be guessed at, and experts vary between estimates as low as 14,000,000 and as high as 30,000,000 The terrible "sleeping sickness" has probably of late years reduced the population to a figure considerably below the higher estimate. Whatever the numbers may be, the inhabitants speak innumerable languages, or perhaps dialects, and practise all sorts of different customs—cannibalism amongst others. The chief town is Boma, the capital, to be rivalled some day by what may become a famous river port—Leopoldville. Of the outlying "stations," the most promising appear to be New Antwerp (formerly Bangala) and Stanley Falls. The whole of the interior may be described as a series of flat table-lands, rising up to points of nearly 10,000 feet in the so-called Mitumba range of the far south and east. These table-lands are exceedingly well forested. Captain Hinde (formerly of the Congo Free State Forces, and second in command of the expedition of 1892 which broke the strength of the Arab slave-traders), writing in *The International Geography*, considers that more than half of the State consists of continuous forest—half a million square miles of trees! If this be so, it must be the largest tree-clad area in the world, not excepting even the Amazon and the Malay Archipelago. The great Aruwimi forest in the north has been immortalised in Stanley's *Darkest Africa*. Such forests argue great rainfall; and herein lies the chief defect of the Congo State from the point of view of a commercial asset to a European Power. Moisture and heat combine to give it a vile climate; and though science in the end may successfully overcome such unfavourable conditions, it is at present pre-eminently unsuitable for European colonisation. As to its natural resources for commerce, it might be described as a one-product country—rubber, rubber, and yet again rubber! The annexed diagram indicates this plainly enough. After rubber,



Congo State Exports—Importance of Rubber.

and a long way after, come ivory, palm oil and nuts, and gum copal. But there are all sorts of possibilities. Experimental plantations of coffee and cacao, tobacco and cotton, have been tried, and not unsuccessfully. Timber is there—obviously—and much of it valuable—to wit, teak and ebony. Large tracts in the south and east, where the country slopes up to the Mitumba range, are said to be suitable for cattle. There are plenty of minerals, though only iron and copper have attained any notoriety up to now. Iron is found in almost every part of the State. Rich copper mines exist in the west between the river Kasai and the Atlantic, and again farther south in Katanga. In the last-named district deposits are said to extend two hundred miles east and west, and fifty miles north and south. No wonder that one railway to it is in course of construction from Lobito Bay, near Benguella, and another—the Rhodesian extension from Broken Hill—is preparing

literally to make tracks for it at an early opportunity. The labour difficulty will be, as always in Africa, the ultimate crux. The native will not work (West Indian and Chinese coolies had to be imported for the building of the Lower Congo Railway); the European cannot, or thinks he cannot, work. Meanwhile conditions are improving with a view, at all events, to make work profitable as well as possible. The waterways of the interior are excellent. There are a thousand miles of almost uninterrupted navigation between Stanley Pool and Stanley Falls. What is known of the tributaries is favourable. Such rivers as the Kasai, Ubangi, and possibly the Lomami, carry more water than do any of the rivers of Europe, and on them and on the Congo itself there must be at least 10,000 miles of navigation ready. Cataract difficulties occur, as everywhere in Africa, in the lower reaches, where the interior table-land, bordered by the highland ridge, drops suddenly to the coast, and will have to be circumnavigated by rail or canal. At present two such railways are in existence—the 260 miles of line between Matadi and Leopoldville opened ten years ago, and the eighty miles connecting Stanley Falls and Ponthierville completed in 1906. Away from the rivers everything is primitive. Man, the least satisfactory and most expensive of all beasts of burden, is still the only means of transport, and his trade routes are narrow paths hacked out through the forests by other men, or trampled out by elephants. Outside, civilisation and commerce are ready. Liverpool and Hamburg, Rotterdam and Lisbon, have frequent steam communication with Banana and Boma. Antwerp sends regular steamers every three weeks. All sorts of manufactured articles—cotton goods at the head, with, alas, what the prosaic tale of the import tables briefly euphemises as "drinks" not so far behind—find ready access and sale in the scattered posts and stations of the interior. It will be interesting to watch the progress of the ship of state now that responsible government takes its turn at the helm.



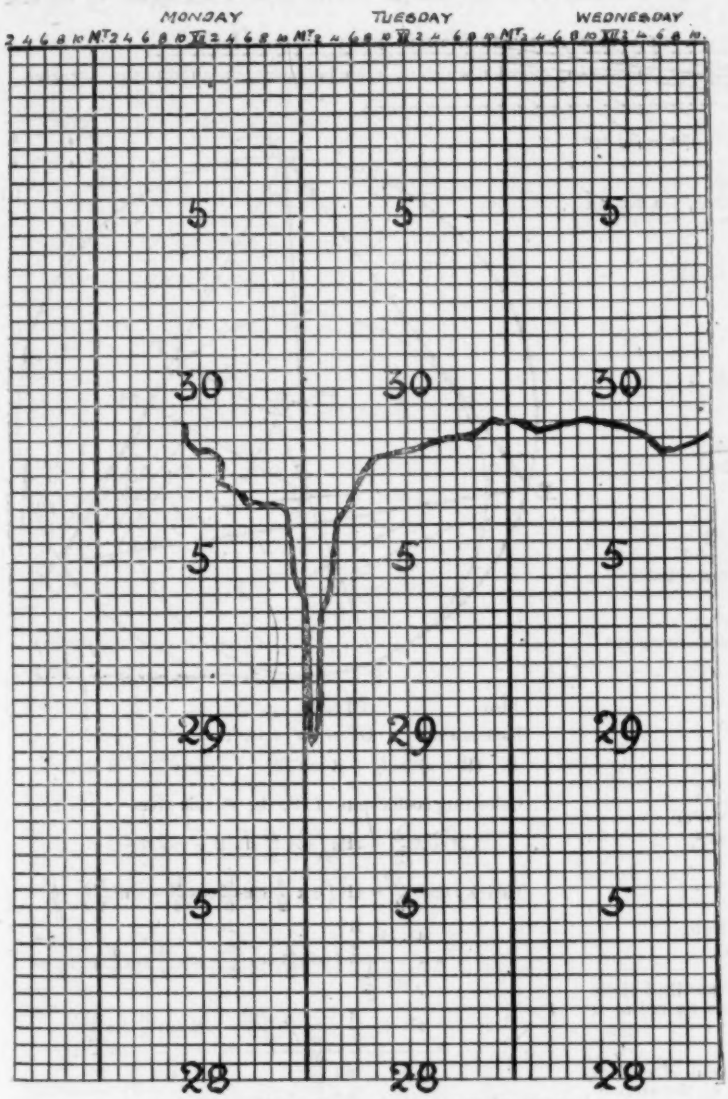
The Hong-Kong Typhoon of July 1908.

The annexed barometer reading is worth preservation, if only as a comparison between the record of a first-class typhoon and the records of local storms in our own latitudes. On the morning of the typhoon the following appeared in the *South China Morning Post*:—

"*Within three hundred miles.*—Through the courtesy of the American Consul-General, we learn that the following telegram was received from the Manila Observatory at 12.45 p.m. on Monday: 'Manila, July 27, 11 a.m. Cyclone or typhoon, west of Balintang Channel, moving west.'"

And "moving west" the typhoon evidently continued—with a northerly twist in it, for the Balintang Channel lies due north of Luzon in the Philippine Isles—until at Hong-Kong and the mouth of the Canton River it struck hard just before midnight on the Monday of the telegram. Practically it lasted from ten o'clock on the Monday night to six o'clock on the Tuesday

morning. The force of the wind was at its worst and the greatest damage was done about 1 a.m., when the barometer had rushed down to 28·9 from 29·65 only three hours previously. By 2 a.m. the instrument was flying up again, until at five o'clock it was once more back to 29·65, after which it maintained as steady a level as if nothing untoward had happened at all. Meanwhile the havoc and destruction had been terrible,



THE HONG-KONG TYPHOON, JULY 27-28, 1908.

Barometer Diagram taken at Messrs. Charles J. Gaupp and Co.'s premises in Chater Road, Hong-Kong.

(From the "South China Weekly Post," August 3, 1908, to which we are much indebted.)

quite as bad as during the memorable typhoon of September 1906, even though the latter had struck absolutely without warning. The graphic journalists of the newspaper from which the above diagram is taken were not slow to supply copy. We append a few items selected from their narratives :—

1. Five miles of wreckage along Canton river-shore.
2. Wreck of s.s. *Ying King*, a Canton river steamer bound for Hong-Kong with 300 passengers aboard, of whom only 50 were saved.

(This was the only great loss *at sea ; on land* many lives were lost.)

3. Collapse of houses in all directions. Fourteen of them fell with a crash in Yaumati, a small town on Kaulung Peninsula.

4. H.M.S. *Astræa*, one of our third-class cruisers, seeing a large Chinese junk in distress, launched a cutter in the midst of the raging storm and rescued the crew.

(This appears to have elicited encomiums on all sides. It was not so much the bravery of the Britishers as the nonchalance with which they set about their dangerous task that compelled admiration.)

5. Ninety-four boats ashore in the neighbourhood of Hong-Kong—one of them, the *Persia*, a vessel of 7,951 tons.

6. A large number—some say one-third—of the boats in Canton River were destroyed.

(*Mem.* — Something like 300,000 of Canton's population live in river-boats.)

7. One landlord alone received in Hong-Kong two hundred notifications of repairs necessary to his property.

Altogether it was a terrible disaster, involving the usual trouble and ruin which are always associated with these July to September typhoons of the China Sea.

Incidentally we cannot help remarking that the *South China Weekly Post*, though it has an office in London, England, has a real transatlantic ring about its headlines and paragraphs. "Good work was done," says one scribe on the wreck of the *Ying King*, "in the recovery of the bodies, and some excellent photos were taken." "All the native craft within sight seemed to have sunk," says another, possibly an *Irish*-American. From many extracts of "fine" writing we extract the following: "Bang! trr-rrr-pop-bop! up went a rocket. A second later, and a stentorian voice shouted, 'Guard, turn out!' Then followed a strenuously blown bugle-call — 'The alarm.' Voices in the darkness—black pitch accentuated by the occasional flash of a searchlight—and yet another rocket, and the dire work of a fell evening commenced graphically.....And the searchlight of the *Astræa* played on that turbulent sea."

IMPORTANT TO TEACHERS OF INFANTS.

NEXT month the Editor hopes to commence the issue of a series of charming

TALES FOR THE CHILDREN,

from the pen of Miss Lily Frith of Sheffield.

Our Query Column.

SOLUTIONS BY A. CLEMENT JONES, M.A., PH.D., SENIOR MATHEMATICAL MASTER, BRADFORD GRAMMAR SCHOOL.

RULES.

1. Each correspondent is restricted to *one* question.
2. Each query must be accompanied by the name and address of the correspondent, and the *coupon* which appears on the back wrapper of the current number of the Journal.
3. CORRESPONDENTS MUST IN ALL CASES STATE THE SOURCE FROM WHICH THEIR QUERY HAS BEEN OBTAINED.

The Editor reserves to himself the right to decline to answer any question which is, in his judgment, unsuited to the Magazine.

Maths.—(a) Show that $a_1 \sin(px - \beta_1) + a_2 \sin(px - \beta_2)$ can be expressed in the form $A \sin(px - B)$.

$$a_1 \sin(px - \beta_1) + a_2 \sin(px - \beta_2)$$
$$= \sin px\,(a_1 \cos\beta_1 + a_2 \cos\beta_2) - \cos px\,(a_1 \sin\beta_1 + a_2 \sin\beta_2).$$

Put $a_1 \cos\beta_1 + a_2 \cos\beta_2 = A \cos B$,

and $a_1 \sin\beta_1 + a_2 \sin\beta_2 = A \sin B$;

that is, $A = \sqrt{\{a_1^2 + a_2^2 + 2a_1 a_2 \cos(\beta_1 - \beta_2)\}}$,

and $B = \tan^{-1} \dfrac{a_1 \sin\beta_1 + a_2 \sin\beta_2}{a_1 \cos\beta_1 + a_2 \cos\beta_2}$,

both of which results are possible.

Then the expression

$$= A \sin px \cos B - A \cos px \sin B$$
$$= A \sin(px - B).$$

(*b*) Factorize

$$(a^2 + 2bc)^3 + (b^2 + 2ca)^3 + (c^2 + 2ab)^3 - 3(a^2 + 2bc)(b^2 + 2ca)(c^2 + 2ab)$$

into four factors.

Let $x = a^2 + 2bc$,
$y = b^2 + 2ca$,
$z = c^2 + 2ab$.

Hence $x + y + z = a^2 + b^2 + c^2 + 2bc + 2ca + 2ab$
$= (a + b + c)^2$.

Also, if w, w^2 are the two cube roots of unity,

$x + wy + w^2z = a^2 + wb^3 + w^2c^2 + 2bc + 2wca + 2w^2ab$
$= a^2 + w^4b^3 + w^8c^3 + 2w^3bc + 2wca + 2w^2ab$
$= (a + w^2b + wc)^2$.

Similarly,

$$x + w^2y + wz = (a + wb + w^2c)^2.$$

The given expression

$$= x^3 + y^3 + z^3 - 3xyz$$
$$= (x + y + z)(x + wy + w^2z)(x + w^2y + wz)$$
$$= (a + b + c)^2 (a + w^2b + wc)^2 (a + wb + w^2c)^2$$
$$= (a + b + c)(a^2 + b^2 + c^2 - bc - ca - ab)^2,$$

for $(a + w^2b + wc)(a + wb + w^2c)$
$= a^2 + b^2 + c^2 - bc - ca - ab$.

Solve similarly: show that

$$(a^3 + b^3 + c^3 - 3abc)(a_1^3 + b_1^3 + c_1^3 - 3a_1b_1c_1)$$

can be put in the form $A^3 + B^3 + C^3 - 3ABC$.

Varsity.—A circle is drawn to touch the circumscribed circle and the sides AB, AC of a triangle. Prove that its radius is $r \sec^2 \dfrac{A}{2}$.

Let I be the centre of the circle, P its point of contact with the circumscribing circle, O the centre of the circumcircle. Then OIP is a straight line.

Draw IM, OE perpendicular to AC, and call the radius IM or IP ρ.

Join IA, then IA bisects the angle BAC, since AB, AC are tangents to the circle.

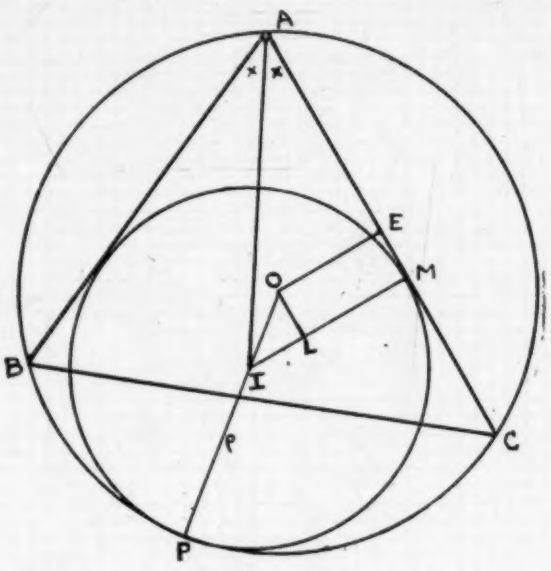
Hence $AM = \rho \operatorname{cosec} \dfrac{A}{2}$,

$AE = R \sin B$,

$EM = AM - AE = \rho \operatorname{cosec} \dfrac{A}{2} - R \sin B$.

Draw OL perpendicular to IM, and therefore parallel to AC.

Now $IM = \rho$,
$OE = R \cos B$,
$IL = IM - OE = \rho - R \cos B$.



Also $OI = R - \rho$.

Hence, since $OI^2 = IL^2 + LO^2$,

$$(R - \rho)^2 = (\rho - R \cos B)^2 + \left(\rho \operatorname{cosec} \frac{A}{2} - R \sin B\right)^2.$$

Collecting coefficients of R^2, $R\rho$, ρ^2, this gives

$$\rho^2 \cot^2 \frac{A}{2} = 2R\rho \left(\cot \frac{A}{2} \sin B + \cos B - 1\right).$$

Hence $\rho \cot^2 \dfrac{A}{2} = 4R \left(\cot \dfrac{A}{2} \sin \dfrac{B}{2} \cos \dfrac{B}{2} - \sin^2 \dfrac{B}{2}\right)$

$$= \frac{4R \sin \frac{B}{2}}{\sin \frac{A}{2}} \left(\cos \frac{A}{2} \cos \frac{B}{2} - \sin \frac{A}{2} \sin \frac{B}{2}\right)$$

$$= \frac{4R \sin \frac{B}{2} \cdot \cos \frac{A + B}{2}}{\sin \frac{A}{2}} = \frac{4R \sin \frac{B}{2} \sin \frac{C}{2}}{\sin \frac{A}{2}};$$

that is, $\rho \cos^2 \dfrac{A}{2} = 4R \sin \dfrac{A}{2} \cdot \sin \dfrac{B}{2} \cdot \sin \dfrac{C}{2}$.

But $r = (s - a) \tan \dfrac{A}{2} = \frac{1}{2}(b + c - a) \tan \dfrac{A}{2}$

$= R(\sin B + \sin C - \sin A) \tan \dfrac{A}{2}$

$= R\left(2 \sin \dfrac{B + C}{2} \cos \dfrac{B - C}{2} - 2 \sin \dfrac{A}{2} \cos \dfrac{A}{2}\right) \cdot \tan \dfrac{A}{2}$

$= 2R \sin \dfrac{A}{2} \left(\cos \dfrac{B - C}{2} - \cos \dfrac{B + C}{2}\right)$

$= 4R \sin \dfrac{A}{2} \sin \dfrac{B}{2} \sin \dfrac{C}{2}$.

Hence $\rho = r \sec^2 \dfrac{A}{2}$.

Rex.—If $\sin(\theta + \phi i) = \rho(\cos\alpha + i\sin\alpha)$, prove that $\rho^2 = \frac{1}{2}(\cosh 2\phi - \cos 2\theta)$.

The given equation becomes

$$\sin\theta \cdot \cos\phi i + \cos\theta \cdot \sin\phi i = \rho\cos\alpha + i\rho\sin\alpha;$$

that is, $\sin\theta \cdot \cosh\phi + i\cos\theta \cdot \sinh\phi = \rho\cos\alpha + i\rho\sin\alpha$.

Equating real and imaginary parts,

$$\rho\cos\alpha = \sin\theta \cdot \cosh\phi,$$
$$\rho\sin\alpha = \cos\theta \cdot \sinh\phi.$$

Square and add,

$$\rho^2 = \sin^2\theta \cdot \cosh^2\phi + \cos^2\theta \sinh^2\phi$$
$$= \tfrac{1}{2}(1 - \cos 2\theta)\cosh^2\phi + \tfrac{1}{2}(1 + \cos 2\theta)\sinh^2\phi$$
$$= \tfrac{1}{2}(\cosh^2\phi + \sinh^2\phi) - \tfrac{1}{2}\cos 2\theta\,(\cosh^2\phi - \sinh^2\phi).$$

But $\cosh^2\phi + \sinh^2\phi = \cosh 2\phi$,

and $\cosh^2\phi - \sinh^2\phi = 1$.

Hence $\rho^2 = \frac{1}{2}\{\cosh 2\phi - \cos 2\theta\}$.

Mathematics.

(i) $\dfrac{dy}{dx} + y\cos x = \frac{1}{2}\sin 2x$.

(ii) $y\dfrac{dy}{dx} + cy^2 = a\cos(x + \beta)$.

(iii) $(2x + 4y + 3)\dfrac{dy}{dx} = 2y + x + 1$.

(i) $\dfrac{dy}{dx} + y\cos x = \frac{1}{2}\sin 2x$.

Now $e^{\int \cos x \,.\, dx} = e^{\sin x}$.

Hence $\dfrac{d}{dx}\left\{ye^{\sin x}\right\} = \frac{1}{2}e^{\sin x}\cdot\sin 2x$,

that is, $ye^{\sin x} = \displaystyle\int e^{\sin x}\cdot\sin x\cdot\cos x\,.\,dx + C$.

In the integral put $\sin x = z$, hence $\cos x\,dx = dz$.

The integral becomes $= \int e^z\,.\,z\,dx$

$= ze^z - e^z$

$= \sin x\,.\,e^{\sin x} - e^{\sin x}$.

Hence $ye^{\sin x} = (\sin x - 1)e^{\sin x} + c$,

or $y = \sin x - 1 + c\,.\,e^{-\sin x}$.

(ii) $y\dfrac{dy}{dx} + cy^2 = a\cos(x + \beta)$.

Write $y^2 = v$, that is, $2y\,dy = dv$.

Hence $\dfrac{dv}{dx} + 2cv = 2a\cos(x + \beta)$.

But $e^{\int 2c\,dx} = e^{2cx}$;

therefore $ve^{2cx} = 2a\displaystyle\int e^{2cx}\cos(x + \beta)dx\,. + c$

$$= 2a\,.\,\frac{2c\,.\,e^{2cx}\cos(x + \beta) + e^{2cx}\sin(x + \beta)}{4c^2 + 1} + c,$$

hence $y^2 = \dfrac{2a}{4c^2 + 1}(2c\cos x + \beta) + \sin x + \beta) + ce^{-2cx}$.

(iii) $(2x + 4y + 3)\dfrac{dy}{dx} = 2y + x + 1$.

The method you attempted fails; the difficulty can be got over thus:—

Put $x + 2y = v$,

hence $1 + \dfrac{2dy}{dx} = \dfrac{dv}{dx}$.

Therefore $(2v + 3)\left(\dfrac{dv}{dx} - 1\right) = 2v + 2$,

or $(2v + 3)\dfrac{dv}{dx} = 4v + 5$;

that is, $dx = \dfrac{2v + 3}{4v + 5}\,.\,dv$,

or $2dx = \dfrac{4v + 6}{4v + 5}dv = \left(1 + \dfrac{1}{4v + 5}\right)dv$;

that is, $2x = (v + \frac{1}{4}\log 4v + 5) + c$.

The solution is—

$$8x = 4x + 8y + 4c + \log(4x + 8y + 5);$$

that is, $4x - 8y - 4c = \log(4x + 8y + 5)$.

Stage 3. *Theoretical Mechanics.*

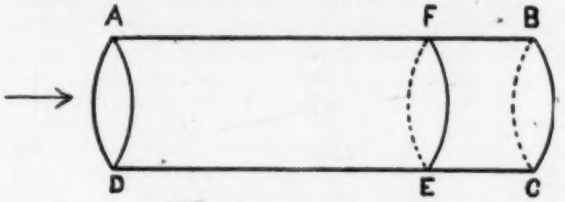
(*a*) Solids.—Greave's *Statics*; Loney's *Treatise on Dynamics*. If a higher standard is possible, Routh's *Dynamics of a Particle* is a good book.

(*b*) Fluids.—Loney's *Hydrostatics*. If you can do this work, Besant's *Hydromechanics* should be useful.

François.—If a medium of density ρ at a pressure p is moving with a velocity $\pm v$, show that the momentum transferred per second per sq. cm. across a surface perpendicular to v is $p + \rho v^2$.

A circular cylinder, of length 100 cms. and diameter 10 cms., is moving parallel to its axis under the action of a force of 10^6 dynes applied at one end. Calculate the pressure at a point 75 cms. from the end at which the force is applied.

Consider a unit area perpendicular to the direction of the velocity, the pressure exerts a force $p \times 1^2$—that is, p units of force on this area. The rate of change of momentum due to a force is measured by the force, and since the force is constant the change in momentum due to it in one second is measured by p. At the same time, every second a volume $v \times 1^2$ of liquid of density ρ, and moving with velocity v, crosses the area. There is then, on this account, a transference of $\rho v\,.\,v$—that is, ρv^2 units of momentum. The total transference in one second is then $p + \rho v^2$.



Let the mass of the cylinder be M grammes, and f cm./(sec)^2 its acceleration. Then

$$10^6 = \mathrm{M}\,.\,f.$$

Now let EF be the section of the cylinder at a distance 75 cms. from AD, the end where the force acts; suppose the pressure on the section is p dynes per square centimetre. The total force on the part EFBC in the direction of motion is then $p \times 25\pi$ dynes, for the area of the section is 25π square centimetres. The mass of EFBC is $\dfrac{\mathrm{M}}{4}$, its acceleration is f, hence

$$25p\pi = \frac{\mathrm{M}}{4}\,.\,f,$$

that is, $p = \dfrac{10^6}{100\pi} = \dfrac{10000}{\pi}$ dynes.

The pressure at the point required is then approximately 3,183 dynes per square centimetre.

H. G. S.—(*a*) The sum of the perimeters of two equal squares and a circle is 100 feet. When is the sum of the areas least and when greatest? Are these true maximum and minimum values?

Let the side of each square be x feet and the radius of the circle be r feet. The condition gives

$$8x + 2\pi r = 100;$$

that is, $4x + \pi r = 50$ . . . . . (1).

Let A square feet be the area, then

$$\mathrm{A} = 2x^2 + \pi r^2;$$

that is, $8\mathrm{A} = 16x^2 + 8\pi r^2$

$$= (50 - \pi r)^2 + 8\pi r^2$$
$$= 2500 - 100\pi r + \pi(\pi + 8)r^2.$$

Hence $\dfrac{8(\pi + 8)\mathrm{A}}{\pi} = 2500\dfrac{(\pi + 8)}{\pi} - 100(\pi + 8)r + (\pi + 8)^2 r^2$

$$= 2500\frac{(\pi + 8)}{\pi} + \{(\pi + 8)r - 50\}^2 - 2500$$
$$= \frac{20000}{\pi} + \{(\pi + 8)r - 50\}^2.$$

The minimum value of the area corresponds therefore to the value of $r = \dfrac{50}{\pi + 8}$; whence from (1) we get $x = \dfrac{100}{\pi + 8}$.

This is a true minimum value. The area has its greatest value when r is greatest. Now x and r must be positive from the conditions of the question, and consequently r is greatest when x is zero—that is, $x = 0$, $r = \dfrac{50}{\pi}$. This is not a true maximum.

Reverting to the equation

$$8A = 2500 - 100\pi r + \pi(\pi + 8)r^2,$$

we get $$\frac{8dA}{dr} = -100\pi + 2\pi(\pi + 8)r.$$

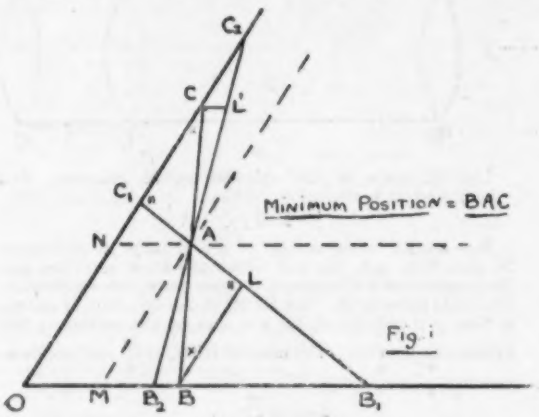
$$\frac{8d^2A}{dr^2} = 2\pi(\pi + 8).$$

Hence $\frac{dA}{dr} = 0$ gives the value $r = \frac{50}{\pi + 8}$, and $\frac{d^2A}{dr^2}$ is then $+ \infty$—that is, this value corresponds to a minimum. There is no maximum value.

(*b*) Find the minimum triangle cut off by a straight line which passes through a fixed point A and intercepts two fixed straight lines OB . OC. Show there is only one minimum and no true maximum.

This question can best be treated by geometry. We understand that the lines OB . OC terminate at O, so that only triangles in the positive quadrant are to be considered.

Draw NA parallel to OB and MA parallel to OC; and take OC = 2ON. Join CA, meeting OB in B, then OB = 2OM. We shall show that the triangle OBC is a minimum. Now, if the variable line through A meets OC within ON, it does not cut the straight line OB; if it cut OB within OM, it does not cut OC. We have then only to consider



positions of the line between NA and MA. Let C_1A_1B be any position of the line between NA and CAB, and draw BL parallel to OC. Now, since ON = NC, and NA is parallel to OB, AC = AB; also by parallels thus

$$\angle ACC_1 = \angle ABL, \text{ and } \angle AC_1C = \angle ALB.$$

Hence $$\triangle ACC_1 = \triangle ABL;$$

therefore $$\triangle ACC_1 < \triangle ABB_1.$$

Add to each the figure $OBAC_1$;

then $$\triangle OBC < OB_1C_1.$$

When the moving line has passed the position CAB, let C_2AB_2 be its position, and draw CL' parallel to OB_2. Then as above,

$$\triangle ABB_2 = \triangle ACL';$$

therefore $\triangle ABB_2 < \triangle ACC_2$, add OB_2AC to each.

Hence $$\triangle OBC < \triangle OB_2C;$$

that is, OBC is the minimum triangle.

In the positions NA, MA the areas of the triangle are infinite; they are not true maxima, but correspond to limiting positions. For a true maximum the area must increase continuously up to the maximum position, and then decrease continuously. In this case it becomes suddenly negative.

The analytical method is as follows, and is worth comparing with the geometrical result:—

Let A be the point (h, k) referred to OB . OC as coordinate axes; and let the position PQ of the line be defined by the equation

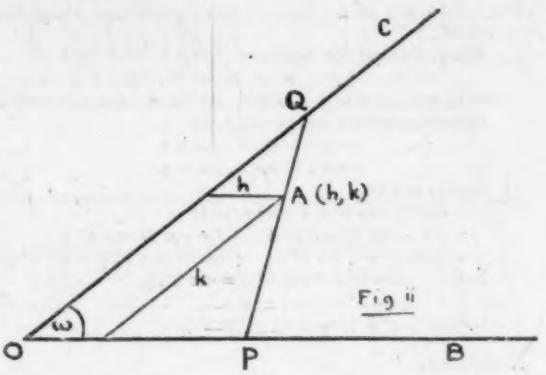
$$OP = \lambda \,.\, OQ.$$

Then by Euclid vi. 2.

$$\frac{OP - h}{k} = \frac{OP}{OQ} = \lambda; \text{ that is, } OP = h + \lambda k.$$

Hence $$OQ = \frac{h}{\lambda} + R.$$

Now $$\triangle = \text{area } OPQ = \tfrac{1}{2} \,.\, OP \,.\, OQ \,.\, \sin w.$$



Hence $$2\triangle \operatorname{cosec} w = OP \,.\, OQ$$

$$= \lambda OQ^2 = \lambda\left(\frac{h}{\lambda} + k\right)^2$$

$$= \frac{h^2}{\lambda} + 2hk + \lambda k^2.$$

Differentiating

$$2 \operatorname{cosec} w \,.\, \frac{d\triangle}{d\lambda} = -\frac{h^2}{\lambda^2} + k^2.$$

$$2 \operatorname{cosec} w \frac{d^2\triangle}{d\lambda^2} = +\frac{2h^2}{\lambda^3}.$$

When $\frac{d\triangle}{d\lambda} = 0$, $\lambda = \pm\frac{h}{k}$. If $\lambda = \frac{h}{k}$, $\frac{d^2\triangle}{d\lambda^2}$ is $+ \infty$, and the corresponding position is therefore a minimum. This is the position BAC in Fig. (1).

If $\lambda = -\frac{h}{k}$, $\frac{d^2\triangle}{d\lambda^2}$ is $- \infty$, and the position corresponds to a maximum.

If this case PAQ passes through the origin, the area is then zero, and if OB, OC be supposed produced, the areas in positions on either side of this are negative in the second and fourth quadrants.

You would find it a very instructive exercise to draw a graph to show the variations in the area. Take the x coordinate in the graph to be the value of λ, and the y coordinate the value of $2\triangle \operatorname{cosec} w$ in the corresponding position. For this purpose take a simple special case—for example, $h = 1$, $k = 2$. You then need to draw the graph of $y = \frac{1}{x} + 4 + 4x$. This can be written $x(y - 4x - 4) = 1$, and represents a hyperbola with asymptotes $x = 0$ and $y - 4x - 4 = 0$. The maximum and minimum values of y correspond to the values $x = -\frac{1}{2}$, and $k = \frac{1}{2}$, in which cases y is zero and 8. The greatest and least values of y are infinite. It will be seen that they do not correspond to true maxima and minima.

A HANDY LIBRARY OF USEFUL KNOWLEDGE.—Messrs. Hodder and Stoughton have performed a useful service in presenting to the public a neat little series of books dealing in a very interesting and popular way with a few of the leading branches of science. Some of these are old friends, but we are glad to see such excellent books produced in neat cloth binding for the small sum of one shilling each. No one should consider that he has done his duty to himself in the matter of general reading until he has gone through the little books in this series; and any one who decides to read them will be so much fascinated by the interesting way the subjects are set out that he will no doubt be tempted to make further inquiries in one branch or another. The *Chemical Elements* are treated by Mr. Pattison Muir, who gives some interesting chapters on the molecular composition of bodies; Professor Seeley writes on *The Earth in Past Ages*, and in the lucid style of which he is a master sets before us the history of our planet. Those who are philosophically inclined will discover much that will interest them in the three volumes entitled *The Mind*, by Professor J. M. Baldwin; *The Religions of the World*, by the Rev. E. D. Price; and the *Extinct Civilisations of the East*, by R. E. Anderson. Natural history is strongly represented by three charming books—*Forest and Stream*, by James Rodway; a delightful account of the habits and instincts of birds, entitled *Bird Life*, by W. P. Pycraft; and the well-known work on *Plant Life* by the late Grant Allen.

Papers for Teachers of Infants.

STORIES IN THE INFANTS' SCHOOL.

BY CLARA E. GRANT, DEVONS ROAD COUNCIL SCHOOL, LONDON.

(*Continued from page 214.*)

Stories for the Babies.

STORIES, again, must be chosen with some regard for the age of the children, though their capacity will naturally vary also with their home education and general social environment. Very young children can only follow stories dealing with life more or less as they know it. They cannot yet throw themselves into conditions and experiences absolutely foreign to their own, the step towards which will be very gradual. For this reason we shall find for the tiny children a large number of little tales of children of everyday life plentifully illustrated with pictures and objects. Then there will be a few of the simpler fairy tales—for example, *Red Riding Hood*, *The Three Bears*, *The Three Little Pigs*, *Tom Thumb*, *The Babes in the Wood*, and *The Bread Crumbs*. Nature stories are less suited to "babies," except, of course, stories of animals they know and care for.

Stories for the "Five-Year-Olds."

These children are—that is, if they have had a carefully-planned and *sufficiently long* year in the "baby-room"—considerably in advance of the "babies," and for these it will be easy to find a scheme of stories more than sufficient to last through the year.

Fairy tales will form the chief group. To those told in the baby-room (which will well bear repetition) we may add *Jack and the Beanstalk*, *Jack the Giant Killer*, *Puss in Boots*, *Beauty and the Beast*, *The Sleeping Beauty*, *Cinderella*, *The Giant in the Bottle*, *Pearls and Toads*. From Grimm we may take the charming *Brother and Sister*; *The Musicians of Bremen*; *Jack in Luck*; *The Sweet Soup*; *The Iron Stove*; *The Poor Cobbler*; *How Cat and Mouse kept House*; *The Straw, the Bean, and the Coal*; *The Poor Miller's Lad*; *The Jew in the Thorn Bush*; *Snowy White and Rosy Red*.

It may be well here to consider one or two criticisms to which, in the face of modern opinion, the above list may be subjected. There are many thoughtful people who feel that it is unwise to tell children any stories which involve wrong-doing, or which are somewhat fierce or violent in their tone. They hold the quite reasonable view that it is better to put before children ideals of lofty character and action to which they can aspire, rather than fearful stories of sinful folks from whose example they must learn to shrink; and they also feel that the violence and fierceness of the cruder type of story are apt to harrow the feelings of sensitive children, or stimulate the hot passions and the morbid tastes already found in human nature. There is so much that is reasonable and right in this view that it deserves careful consideration. Now it is quite true that we do not need stories which are full of either horribly bad people or too vivid pictures of vice, in order to incite virtue. But there is a real danger nowadays of a too etherealised attitude towards our children—the danger of the "diamond and lily" atmosphere which is no preparation for the sterner realities of life; and, again, there is something unreal to children about the "'unco' good" boy or girl so often described in "moral" stories. Tales of real heroes and heroines who have lived and done noble deeds are excellent, and make a real appeal; and there is no need here to introduce the failings and weaknesses which probably most of them had in ordinary life, because in these stories attention is rightly concentrated on the supreme acts of their lives which gave them immortality. But great heroes and saints are scarce, and stories of ordinary "good" people are often insipid and uninteresting. As we have said before, the boy who has too little of the "old Adam" in him has often only too little of anything else. Many anxious souls have puzzled over the sinfulness of the Bible characters, when, as a matter of fact, these men, with all their failings, are much more human and encouraging to us than any number of "saints" whose example it seems so impossible to emulate. It is as much a comfort to some minds as it is a trial to the faith of others that even the "chosen twelve" contained a deliberate traitor, an "honest doubter," and a warm soul whose faith and loyalty deserted him more than once; and that even the specially chosen "three" could not "watch" during the "one hour" of their Master's supreme agony.

After all, evil exists—very much so—and there may be real danger in avoiding, in the nursery and schoolroom, discussion on the less pleasant realities of life which children must face when they leave its shelter, and there may be a real gain in contrasting right with wrong. Stories are not necessarily ethical, and they are certainly not natural, when they are full either of heroes or of villains. The "true" story will contain both types; and so long as right triumphs and wrong meets with its deserts, it must have a real ethical value. But even granting the legitimate presence of evil in a story, it is argued that the older tales are so very "horrible," so full of violent and fearful deeds, that, whilst the animal boy gloats over them, the sensitive child shrinks in fear. Well, that may be so; but we must remember that the older tales necessarily portray the primitive ages in which they were written, the ages when life and character were much more crude and elemental. In these stories the villains were very black and the heroes very white. There are none of the finer subtleties of light and shade which make no appeal either to the childhood of the race or of the individual. It is just the broad and simple elementals of life which come in—loving and hating, saving and killing, fighting and feasting. As for the "sensitive ears," whilst we grant the claim of certain children to special consideration, it is almost universally agreed by scientists that the attitude of the child towards pain is, like that of the savage, very different from that of the modern adult with his highly-evolved nervous and mental organism. Children do not mentally realise the more terrible things which happen to their heroes and villains; and, after all, life and death are all around them. We do not want unnecessary "realism," but we do want the "real." "I would not teach children the story of Cain's offering," say some critics. They evade the smell of the burnt-offering which was man's primitive form of wor-

ship, yet they cannot evade the smell which goes up each day from the frying-pan, when that same burnt-offering is applied to man's human needs. There may be something equally beautiful in both conceptions, if rightly viewed and wisely treated. But the "improving" of our children's classics still goes on. "Even Little Red Riding Hood," says a recent critic, "is no longer devoured by the wolf, as in the older editions of that ever new tale. This shows a real advance in nursery education." It is certainly a more satisfactory ending to the children, who desire that all their heroes shall "live happy ever after." But the wolf ate the grandmother, nevertheless, and no doubt deplored the incident which deprived him of Red Riding Hood. As we go on "improving" our old tales, Mr. Wolf will, no doubt, voluntarily resign the grandmother, and, in the last edition, die a vegetarian. There is something gruesome about *The Wolf and the Seven Kids*—something abnormal about the intact condition in which the kids entered and emerged from their uncomfortable quarters—yet how human that story is: The children left at home, the maternal warnings against possible "strangers at the gate," the cunning of the old wolf, and the clever outwitting of an enemy by a fond mother; whilst those of us who heard Miss Shedlock's charming rendering of the story, with its gentle little command to the baby kids to "step out softly," will forget, as will the children, all the gruesomeness and abnormality.

We trust we may be pardoned this long defence of Grimm's and kindred tales, but we wish to help to preserve to the children all of their legitimate heritage. We will only add the fact recorded by Miss Dodd that "Professor Rein, who has worked out a series of lessons on fairy tales suitable for the children of the first school age (aged six and seven) in the Thuringian Forest, selects many of his stories from Grimm. These stories are happily chosen, the brothers Grimm gathering many of their stories directly from the lips of the Thuringian peasants, who had received them as oral traditions from remote ancestors."

The stories of Hans Andersen seem to us rather less suited to very young children, though excellent at a slightly later stage. There seems to be more elaboration of detail and circumstance, and the philosophy is more conscious. *The Wild Swans*, however, *Thumbeline*, *The Little Match Girl*, and a few others are quite suitable, *The Wild Swans* being really delightful.

Nature and Correlative Stories.—In addition to the fairy tales and others interesting to the "Fives," there will be many pretty stories illustrating lessons on Nature or common things around, such as can be found in the *Books for Bairns*, various books of animal stories, *In Nature's Story Land*, and many others. We have left the consideration of these and of "stories for the elder infants" and other questions for a later article (with the Editor's permission), when we hope also to give a little bibliography of stories in use in the writer's school.

SPECIAL NOTICE.

MESSRS. THOMAS NELSON AND SONS have in the press a new and very attractive Prize Book Catalogue, entitled

THE CHOICE OF A GIFT BOOK,

which makes the work of selecting Prizes or Gifts not only simple but highly interesting. A copy will be posted to any reader of the *Practical Teacher* who sends name and address.

MORAL TEACHING AND TRAINING FOR INFANTS AND JUNIORS.

BY MABEL A. BROWN.

Central Idea for November.

"God looks at us not as we are, but as we are becoming."

Divisions of Subject.

Week 1. Appearances are deceptive.
Week 2. Despise not the day of small things—(*a*) natural world—for example, acorns, etc.; (*b*) spiritual world—for example, influence, words.
Weeks 3 and 4. Hidden life and beauty—(*a*) natural world—for example, bulb, seed, chrysalis; (*b*) spiritual world—for example, development of beauty in the character.

Scripture Stories.

Week 1. The parable of the Pharisee and publican (Luke xviii.). The anointing of David—the youngest son (1 Sam. xvi.).
Weeks 1 and 2. The story of Gehazi—the trusted servant of the man of God. Naaman the Syrian—despises the *simple* cure prescribed by Elisha (2 Kings iv. and v.)
Week 2. Story of the widow's mite—highly valued by Christ—"all that she had" (Luke xxi.). Christ's teaching about little children (Matt. xviii. and xix.).
Weeks 3 and 4. Parables of the sower, the mustard seed, the leaven, the tares (Matt. xiii.).

Texts and Mottoes.

"Man looketh on the outward appearance, but the Lord looketh on the heart."
"Suffer little children," etc.
"All that glitters is not gold."

Hymns.

"We are but little children weak" (*Ancient and Modern*).
"I love to hear the story" (*Ancient and Modern*).

Nature Study.

Week 1. Protective mimicry in nature. Colouring of animals in accordance with their surroundings—for example, tiger's stripes, leopard's spots, winter coats of animals. Protective resemblance in the animal world to leaves and twigs.
Week 2. Study of the oak tree (grown from a tiny acorn). Acorns and other tree fruits. The guests of the oak tree. Timber. Squirrels and their food.
Week 3. Study of bulbs. Germinating seeds. The chrysalis.
Week 4. Preparation for winter in the plant and animal world. Bulbs to be grown in glasses, and painted at intervals. Seeds to be germinated, and painted in the same way.

Literature.

Week 1. The Frog Prince (Grimm's *Fairy Tales*). The Goose Girl at the Well (Grimm's *Fairy Tales*). The Ugly Duckling (Andersen's *Fairy Tales*). Stories from *The Jungle Book* (Rudyard Kipling).
Week 2. Meek and Lowly (*Earth's Many Voices*). Little Comforters (*Earth's Many Voices*). The Pea Blossom (Andersen's *Fairy Tales*). Consequences (*Parables from Nature*).

Weeks 3 and 4. The Awakening (*Earth's Many Voices*). Redeeming Points (*Earth's Many Voices*). A Lesson of Faith (*Parables from Nature*). Not Lost but Gone Before (*Parables from Nature*).

Recitations and Literature Studies.

November (Thomas Hood).
The Mountain and the Squirrel (Emerson).
Life of an Oak Tree (one of the *Books for Bairns*).
The Chrysalis (Miss Warmington).
Little Things (*Recitations for Infants' Schools*, published by Blackie at 6d.).
Suppose the Little Cowslip (*Recitations for Infants' Schools*, published by Blackie at 6d.).
Robin Redbreast (*Model Poetry Book*, Junior Division I., published by Blackie at 2d.).

Kindergarten Occupations.

Week 1. As the nature study does not lend itself very well to expression work, it would perhaps be better to base the occupations on the story chosen. The lower standards might do brushwork studies of a jungle, and the various plants and grasses which grow there—for example, palm, bamboo, etc.—also simple studies illustrating protective mimicry.
Week 2. Brushwork—germinating acorns, various stages.
Clay modelling—acorns (infants); spray of oak (juniors).
Paper-cutting—an oak leaf (coloured paper).
Blackboard drawing—a squirrel.
Weeks 3 and 4. Brushwork—study of hyacinth bulb before development; study of pea and bean before development
Clay modelling—various bulbs. Snowdrop, tulip, hyacinth, crocus, etc., to be modelled before planting.
Drawing—(juniors) onion bulb in section; (infants) onion bulb.
Paper-cutting—(juniors) a hyacinth glass; (infants) a flower-pot.

Recommended for Teacher's Reading.

The Oak and the Broom (Wordsworth).
The Kitten and the Falling Leaves (Wordsworth).
Autumn (Longfellow).
Autumn (Keats).
The Talking Oak (Tennyson).
By the Fireside (Browning).

DOROTHEA BEALE.*

AMONG the small band of distinguished women who, during the latter part of the nineteenth century, worked a complete revolution in the education of middle-class girls, Dorothea Beale was one of the foremost; and her most enduring monument is the Cheltenham Ladies' College, over which she presided from 1858 to the date of her death in 1906.

Miss Beale herself compiled a *History of the Ladies' College* some six years before her death, and her biographer also gives us in outline the story of the famous institution. This was inevitable, for in a very real sense Miss Beale was the college; but we looked for a biography of the great teacher of a somewhat less reserved character than the present volume, not from any feeling of prying curiosity, but because it is impossible to sum up the effect of Miss Beale's work as a social movement on the somewhat scanty personal data given in these pages.

Having had our grumble, we may say unreservedly that Miss Raikes's book is full of interest from cover to cover. The reader can with some readiness trace the development of a character in which the Arnoldian "high seriousness" predominated, a character which, because of its very strength, did not readily assimilate with others, one which asked no reward for work accomplished except "the wages of going on."

One could wish that Miss Beale had been still with us, and had been asked to read before the Moral Congress a paper on "Moral Instruction by Means of Literature." Her biographer shows clearly in the following passage on what lines such a paper would have been drawn up. The question of abstract morality without reference to a personal Deity Miss Beale would not have discussed.

"Miss Beale's English literature lessons may, more than any others she gave, be described as *sui generis*. 'Miss Beale gives literature lessons of a peculiar kind,' was the appreciation of a new pupil who had studied the subject before coming to Cheltenham. Her literature lesson, indeed, had many functions. *The subject became the vehicle of much teaching that it was not convenient to give in a Bible lesson.* She sought to interest her class in books, in reading, in noble thoughts, in fine prose and poetry. But this was by no means all. She sought primarily to give views of life, conduct, and character such as would enable her hearers to go from school into a larger world, already prepared to know what to find. Under the names of friend and friendship much was said which might apply equally to the choice of a husband and to marriage. Knowledge of character, she would often say, is so important for women. Hence she liked, if possible, once a year to read and lecture upon one of Shakespeare's great plays to the first class. Though ever fresh and interesting..... there was very little variation in the treatment of the main theme. Ophelia.....was the woman who failed a man because she could not dare to be true.....Desdemona, again, was always marked as the wife who not unnaturally roused the suspicions of a jealous-minded husband because he knew that in marrying him she had deceived her father. The misery that may follow a secret, wilful marriage was always hinted at when this story was told."

There are other descriptions in this volume of unconventional methods which would appeal to the human side of girl nature as much as to the intellectual, for there seems to have been in Miss Beale little of the hardness—shall we say the crystalline character?—which distinguishes so many products of the modern education of women. Teachers of all grades will find in this volume much that is helpful and stimulating in their daily work. It is a book to add to one's own library and make a daily companion. There are only too few volumes of the kind available for the teacher.

The biographer has no small share of the saving grace of humour. On a certain occasion—it was in 1902—

"Miss Beale went to stay with old pupils in Scotland, coming afterwards to Newcastle, where she was asked to launch a ship. Her ignorance of use and wont under conditions fairly well known to most people came out when she attired herself for this event in well-looped-up dress and indiarubber shoes. Much as she disliked adventure, she was prepared to march into the Tyne if the glory of the Ladies' College demanded it."

* *Dorothea Beale of Cheltenham.* By Elizabeth Raikes. Archibald Constable and Co.

NEXT MONTH.

SPECIAL reviews of—

Hall Caine's "MY STORY,"
Helen Keller's "THE WORLD I LIVE IN," and
William Hole's pictorial "LIFE OF JESUS OF NAZARETH."

NOTES FROM THE NORTH.

BY ROBERT DICKSON, M.A., F.E.I.S.

FOR the second time within three years the Educational Institute of Scotland has been compelled to change its meeting-place. This year the annual business meeting, which, according to the circumlocutory phrase of the Royal Charter, is to take place "on the Saturday immediately following the third Friday in September," was held in the spacious Synod Hall, Edinburgh. Owing to the great increase in the membership of the Institute during the past few years, the delegates, who are chosen in the proportion of one to every six members, numbered fully 1,600, and as a result both the hall in which the meeting was held and the rooms, in which more than sixty publishing firms showed their latest, most up-to-date, and most artistic productions, were crowded most of the day. Though this is designated the business meeting of the Institute, yet it is the custom for the retiring President to give some indication to the public of the official opinion of the Institute on the several questions that have occupied its attention during the past year. As was to be expected, therefore, Mr. J. M'Whan, F.E.I.S., Cambuslang, took as the subject of his valedictory address the various provisions of the Scottish Education Bill, now before the House of Commons. In his introductory remarks he expressed regret that the Secretary for Scotland had not seen his way to deal with that which most educational reformers considered the essential feature of any Education Bill—namely, the extension of areas.

The September Meeting.

THE Bill had been called an "Administrative Provisions Bill." Many of these provisions deserved careful attention. The additional powers granted to School Boards were in the main on the lines of powers actually taken by the leading School Boards, and might be read as at once removing any possible doubt as to their legality, and inviting the more timorous and unduly economical Boards to go and do likewise. The very fullness with which the powers were specified would have the effect of more strictly limiting the initiative of those authorities which had hitherto acted fearlessly in the exercise of their discretion. It was not pleasant to contemplate the possibility of a Cockerton case in Scotland. Their protection against surcharge lay in the provision that they might pay such reasonable expenses incidental to the proper discharge of their duties as might be sanctioned by minutes of the Department.

Additional Powers.

THE physical well-being of the child was also attended to. Only carping critics would sneer at medical inspection and the care of neglected children as violating the law of the survival of the fittest. In industrial centres, where dissolute parents could best escape attention by getting lost in the crowd, and where they concealed their depravity and loss of self-respect by continual removals, many of the fittest of the children were annually dragged down and sacrificed. They were underfed or improperly fed, their clothing was not infrequently a veritable bundle of rags held together by pins or strings, while personal cleanliness and freedom from vermin were not looked upon as virtues. No effort was made to promote their moral or physical welfare by keeping them from bad practices, or by attending to minor ailments. Nothing short of a revolution should be accomplished by the operation of the Bill, as culpable neglect, if continued, would inevitably result in the appearance of the parent or guardian before the sheriff. It should not be forgotten, too, that the "Children Bill" had also been reported to the House. The two Bills, taken in conjunction, constituted what might paradoxically be termed a "Magna Charta of Limitations" for young people, and could not but exercise a beneficent influence on the mental, moral, and physical welfare of school children.

Physical Well-Being.

THE President thought that a distinct forward step had been taken in regard to continuation classes. Intelligent and up-to-date School Boards—those that had already fostered such work—were encouraged by the grant, under suitable limitations, of power "to make, vary, and revoke" by-laws compelling the attendance at such classes, not necessarily in the evening, of young people from fourteen to sixteen or seventeen years of age. The driving power was adequate, for parents and employers were equally subject to a money penalty for any breach of the by-laws. The Lord Advocate was to be praised for conceding that on this question small Boards might require coercion. Seeing that the ideal solution by extension of educational areas had been deliberately excluded, the President frankly conceded that the substitute provided was an act of justice to progressive Boards that could not but be productive of a valuable forward movement in secondary education. The Government was entitled to credit for the scheme under which School Boards were to be reimbursed for the total outlay incurred by them in providing intermediate or secondary education for children who did not reside within their jurisdiction. It was also a tacit admission from some staunch friends of small Boards that they were insufficient for secondary education. Doubtless there would be cases, especially in urban districts, where Boards would be chagrined to discover that after making ample provision in their own parish, they were deprived of some part of the District Education Fund on account of those pupils who found their educational needs more satisfactorily met in city schools.

Continuation Classes and Secondary Education.

NO apology, he thought, was necessary for making reference to the position and prospects of many rural teachers. It would not have been necessary to confer such a right of appeal as had been given in Clause 19 of the Bill, if it had been truly comprehensive, for cases of arbitrary and capricious dismissal occurred almost exclusively in small parishes, where School Board unemployment, gossip, petty jealousies, and narrow views prevailed. Extended areas would at once have obviated the necessity for appeal, and attracted the best class of men to the profession by the guarantee they would have afforded of security of tenure for the efficient and promotion for the meritorious. There was a time when class teachers in town schools looked forward to the mastership of a country school as genuine promotion; but the average class teacher, either man or woman, with eight or ten years' experience in a town school, had now a better position and better prospects than a contemporary in the country. Class teachers had been able by combination to secure considerable improvement

Rural Teachers.

in their position. Rural teachers dwelt far apart, met rarely, and had little power of combination, with the result that they had been left behind in the race. Men of ability beyond the average found themselves condemned to lose all prospect of betterment.

IN ordinary course, continued the President in dealing with this part of his address, the city population was refreshed and invigorated by the influx of fresh blood from the country. In the past country lads had gone to the cities with the assurance of success, many of the most important positions in church, school, and office being held by them. If that desirable result was to be continued, it was essential that the country teachers, men and women, should be in a position of equality with their town brethren. The average salary paid in Scotland was now over £150 for men, and almost £90 for women; but it was notorious that the averages for rural teachers alone did not reach these figures, and that great numbers had no hope of ever reaching the average. "Once a rural, always a rural," was beginning to hold good. The most recent returns showed that 51 masters received less than £75, and 425 between £75 and £100 per annum; while 99 women, fully certificated, were staved off with less than £50, and thousands of others with only a little more. These starvation wages were paid in the smaller parishes. Was it to be wondered, he asked, that School Boards complained of the difficulty experienced in getting suitable candidates for vacancies in rural schools? Education was no longer a parochial but a national question, and it was in the public interest that the remuneration offered to teachers in rural schools should be at least equal to that paid to class teachers in urban schools. That consummation was not likely to be reached so long as two-thirds of the School Boards of Scotland had only mere handfuls of children to provide for.

Necessity for Improvement.

MR. S. M. MURRAY, treasurer and organising secretary, in his financial statement for the year, pointed out that the Institute was in a fairly flourishing condition. During the year no fewer than 1,020 new members had been added to the membership. Fully £800 additional had been invested during the year, so that the Institute has now a highly satisfactory financial standing. The afternoon meeting, which is usually somewhat lively, this year passed off very quietly. The one subject on which it was expected a breeze would arise was Superannuation; but the meeting evidently felt that the question was perfectly safe in the hands of the Superannuation and Parliamentary Committees. We are not yet out of the wood in this matter. Too much talk might therefore have been harmful rather than beneficial, and the delegates evidently thought so. As a result, the afternoon sederunt was the shortest on record. The general feeling of those present at the sixty-second annual business meeting was, I believe, that the Institute had done well to secure the Synod Hall for its place of meeting. It is well adapted for such a gathering as ours, and is one in which we can hear and be heard. The suite of rooms in which the publishers' exhibits were housed could hardly be improved on. In every way the meeting was a great success, and hopes were freely expressed that the Institute had at last found a permanent meeting-place.

Finance.

AGRICULTURAL EDUCATION.

THE Memorandum on Agricultural Education (the full title is too long to quote) just issued by the Board of Education is fruitful reading in more senses than one. It brings home once again, from a different point of view, the immense benefit conferred on English education by the Act of 1902—the linking together of all educational agencies in any one part of the kingdom under a single authority. It is this concentration of authority which has made possible the ramification of educational activity into what used to be the most desolate part of the educational field—rural agricultural instruction; its systematisation, and joining up with higher technical and scientific instruction in a way that has never before existed in this country. That educational authorities are awake to their duties is seen in the list of thirteen counties, named in the Memorandum, which possess organised systems of agricultural instruction, ranging from the humblest and most practical teaching in dairy work and bee-keeping given by peripatetic instructors, up to winter courses for farmers' sons and scholarships for higher work at agricultural and university colleges.

That prejudice still remains to be overcome the Memorandum is a proof. Some of that prejudice is a deep-rooted Anglo-Saxon mistrust of the value of technical instruction in so practical a matter as agriculture. Some is founded on the lamentable use made in some districts of the "whisky money" with which, in 1890, the Technical Instruction Act of 1889 was endowed. This Memorandum should go far to remove these prejudices. The little history of the development of the administrative conditions regarding this sort of education is sufficiently interesting. Beginning with grants made by the Science and Art Department for "Principles of Agriculture" in 1875; passing through the work of the Board of Agriculture, born in 1889; accelerated by the Technical Instruction Act of 1889, and further helped by the "whisky money" in 1890; unified to some extent by the Board of Education Act of 1899, it was finally helped on to its present position and organisation by the Acts of 1902 and 1904. The movement is one of steady evolution, and we believe it will still continue to evolve, for in a way it is at the root of the "back to the land" problem. Meanwhile the Memorandum will do yeoman service in calling attention to the manifold ways in which the Board of Education is prepared to assist the work financially.

ASSISTANTS IN COUNCIL.

THE National Federation of Assistant Teachers has been in Conference at Manchester. The presidential address, delivered by Mr. H. Pearson, was occupied with a discussion of the matter which has been much before the public eye of late—the supply of teachers. Rightly assuming that the "supply" depends in a large measure in the nature of the "training," Mr. Pearson was at some pains to epitomise the changes in training which have marked the evolution of the bursar from the indentured pupil teacher. While rejoicing in the larger educational inheritance of the bursar, he sees, like every one else, the lion of practical inefficiency in the path of the future teacher, and his quotations from published memoranda of the Board of Education were pertinently chosen to show that the Powers-that-be in Whitehall are also afraid of the aforesaid lion. In the course of his speech he made a practical suggestion—namely, that a testing period should be imposed *before* a bursarship is granted, with a view to euthanasia, so far as a teacher's life is concerned, of intending bursars who show no aptitude for the profession.

Then he turned to the "supply," a matter with which the country has been ringing. The "disquieting rumours" concerning outgoing students, of which Mr. Pearson spoke, have become very disquieting realities. We have information in our hands which bears out only too well his pessimistic remarks on the future of large numbers of recently qualified young teachers; and it is quite clear that, as Mr. Pearson said, some practical method of approximating supply and demand will have to be found. His own suggestions comprise (*a*) smaller classes; (*b*) the gradual disappearance of the supplementary teacher; and (*c*) the formation of an official estimate of the number of candidates required annually, and the apportionment of these candidates among the education authorities in proportion to the school population of their areas, for purposes of training. With the first two we are fully in sympathy; the third resembles too much an arbitrary interference with what is, after all, a personal matter to be generally approved. He forgot one thing—the creation of the student teacher as a *responsible member of a staff*, when he or she should be a student pure and simple, has added another complication to the question of "supply" quite as potent as the supplementary teacher.

The Editor's Bookshelf.

SELECTED HISTORY BOOKS.

ALL movements of a progressive character consist of two well-marked steps—first the awakening to the existence of some evil, and next the devising and carrying out of a remedy. In the change that is taking place in the teaching of history in our schools we have arrived at the beginning of the second stage. For this reason we approached this parcel of history books with unusual interest. Much has already been done by the introduction of such methods as are embodied in Strang's *Historical Tales* or Nelson's *Highroads of History*, and we wondered what new means had been devised for loosening the Gordian knot and opening up the royal road to history. We must confess, however, that our first feeling was one of disappointment. None of the volumes present any distinctly novel features, and some are quite on the old lines; but, after all, we must not overlook the fact that in teaching history the text-book is merely subsidiary to the teacher, its function being to provide a permanent record of the salient points of the oral lessons; and if it does this, a good teacher asks no more, preferring to rely on himself to endow the subject with the vividness and reality that must be given to it if the teaching is to be of any real value.

The most striking book in the parcel is H. E. Marshall's *Through Great Britain and Ireland with Cromwell* (Jack), in which the suggestion of the Board of Education that, where possible, history and geography should go hand in hand has been carried out most successfully. The author has been most happy in his choice of a central figure, for we cannot recall any character in the whole range of history whose associations are so widely distributed. The story of his youthful days carries us to the Fen district; the various campaigns in the Civil War bring the whole of England beneath our notice; while the events subsequent to the death of Charles afford ample opportunity of dealing with the chief points in the physical and political geography of both Ireland and Scotland. Thus we have a stirring and important period in history serving to impart quite a new interest to a well-marked portion of the geography—a unique combination that will commend itself to every one. The book is written in a bright, attractive style, and has some very clever illustrations, while useful maps are provided showing all the places under consideration.

In *English History from Original Sources* (Blackie) the editors have given effect to another suggestion of the Board of Education, that "both teachers and scholars should realise what are the sources of knowledge on any portion of history." Each volume deals with a definite period, and extracts are given from the writings and jottings of men who lived at or close to the times when the events recorded took place, and who in some cases were eye-witnesses or partakers in those events. The extracts have been carefully selected, and coming as they do from various sources, cannot fail to expand the reader's conception of the subject. The quaint language of many of the extracts, however, renders the book unsuitable for use in an ordinary elementary school; but we should strongly recommend its adoption in a secondary school as a supplementary text-book, for there is a vitality and atmosphere about contemporary descriptions that cannot be found elsewhere. More suitable for the elementary school is the method of taking as a starting-point those objects or places in the neighbourhood that possess any historical interest, and for those who prefer this mode of treatment there are several very good county histories.

Stories from the History of Oxfordshire (Clarendon Press) is a bright little volume suitable for those standards in which story-telling has not yet given place to systematic instruction.

We have read *The Story of Cheshire* (Arnold and Son) with much pleasure. The writer has, of course, an immense store of material on which to draw, but he has handled his subject with great skill, and has given us a story which is interesting and intelligible to children without being meagre or superficial.

Dorset (Blackie) is another capital little book for the schoolroom. Here there is not such a wealth of material to work upon, but what there is has been utilised to the best advantage.

A School History of Lancashire (Methuen) should find its way into the hands of every teacher in the county, for the subject has been treated in a most thorough and comprehensive manner; but, unfortunately, this detailed treatment which makes the book invaluable to the teacher quite unfits it for the classroom, for it could only be used by the most advanced scholars, and this is, of course, quite contrary to the usual method of making the county the starting-point of the history.

The History of Scotland (Oliver and Boyd) tells its story in a concise and interesting manner, and although intended for use north of the Tweed, it would form a useful supplementary reader on the other side of the Border, thus enabling children to see many familiar events approached from quite a fresh standpoint.

As long as examinations continue, text-books will be arranged to meet the special needs of candidates. *The Groundwork of English History* (Clive) is intended for those taking London Matriculation, but we would strongly recommend it to any one wishing to take merely a general survey of English history, the material being well arranged to show as far as possible the cause and effect of the various events that have shaped the destinies of the nation.

The History of Great Britain, 1688–1760 (Clive) would be invaluable to students studying this period under proper guidance, but it is too detailed for the private student to use profitably.

Clough's Certificate History, 1763–1815, is written in an interesting and readable style. The events connected with the French Revolution are dealt with in a very able manner, but this portion completely overshadows the rest of the period.

The Cave Boy of the Age of Stone (Harrap) is an interesting little tale, in which the writer attempts to portray life in the neolithic age. This might be useful in the hands of a skilful teacher, but the impression conveyed by the story itself is that life at that time was a perpetual picnic.

AN ADVANCE PARCEL OF GIFT BOOKS.

MESSRS. NELSON AND SONS.

The Jewelled Lizard. By W. Dingwall Fordyce.

When we find that the scene is laid in Sumatra, to which place our hero, a youth about sixteen, is travelling in search of the health he has lost in the process of growing too rapidly, we expect a book full of adventure and hairbreadth escapes, and we are not disappointed.

This is a volume brimful of exciting exploits, and lacking nothing in its vivid colouring to win and hold the interest of readers of all ages.

The two coloured illustrations are excellent, and will tend to make the reader wish that more of the same kind had been provided.

The binding, print, and paper are all excellent.

The Enchanted Egg. By Harold Avery.

This is essentially a children's book, with that magic touch which wins and retains the attention and absorbed interest of our young friends. As its title implies, the reader is invited to follow the wonderful adventures of a penguin's egg given to two children by an old lady, whose son had brought home many "queer things from furrin parts." The quest will, we feel sure, afford an endless fund of fanciful and instructive amusement, and the bright eyes of the little ones will become brighter still in seeking it, notwithstanding its will-o'-the-wisp-like propensities.

A Trip to Fairyland, and Sindbad the Sailor.

These volumes form a welcome departure from the usual fairy tales for the nursery, being Tommy's adventures on his first and second journeys to that elysium of childhood's imagination. A map of fairyland, indicating his route and the places he visited, will form an interesting study for our young folks, introducing all the well-known nursery tales of the Yellow Dwarf, The Three Bears, Dick Whittington, The Forty Thieves, etc.

In the second volume the journey is continued, and Tommy meets with the Giants, Sindbad, Beauty and the Beast, Bluebeard, Aladdin, etc.

Each book, bound in coloured boards, contains nine beautiful coloured illustrations, and these, together with the excellent letterpress, are sure to enchant the hearts of the little folks.

Ralph the Outlaw. By Mrs. Henry Clark.

This attractive gift-book is well adapted to attract and interest not only the young people, but also their elders.

The adventures of the hero, his daring exploits and wonderful escapes, will be followed with absorbed attention. The character of the hero and the good moral tone throughout offer a fund of healthy reading which will not only amuse but elevate the trend of thought and action in the readers of this admirable volume.

The illustrations are perhaps not so numerous as they might have been, but the graphic and picturesque descriptions more than make up for any deficiency in this respect.

The binding is excellent, and the print and paper are all that can be desired.

The Children's Treasury of Pictures and Stories. No. IX.

This is one of a series of volumes comprising short stories, anecdotes, and a serial, interspersed with numerous black-and-white and several attractive full-page coloured illustrations. The book fully deserves its title of a "Treasury." It is full of good things, and offers in its numerous pages wit, humour, and amusement of the best. Young people of both sexes from eight to fourteen years of age will find all they can desire to interest and to add to their stock of knowledge.

(1.) *The House that Jack Built.* (2.) *Gulliver's Travels.*

The old nursery stories presented in these beautifully coloured children's picture and story books, and in a fresh and attractive form, will be a source of unflagging interest to the small folk who are fortunate enough to receive them as gift or prize books.

One of the most satisfactory items is that it is no longer necessary to go abroad for colour printing; the work of Messrs. Nelson and Sons in this direction is well known, and these volumes appear to be perfect examples of what a child's book ought to be.

Country Friends.

The country, with its many and varied attractions, is always a favourite with the young people, and this volume, splendidly illustrated in colours, with good type and tasteful covers, will be a very acceptable gift or prize book.

It is undoubtedly a good thing for young or old to become acquainted with our dumb friends, and a work of this kind combines instruction with amusement.

A NEW SERIAL.

London Town, Past and Present. Part I. By W. W. Hutchings. (Cassell and Co.)

We sincerely hope that there is a very large public for Messrs. Cassell's new serial venture, for this will mean that there is real, living interest in the annals of the great metropolis which remains by far the greatest wonder of the wonderful modern world. The first part of this new issue lies before us, and so far as externals go it is a thing of beauty. The subject matter is pleasantly written, and appears to have been planned on sensible lines. It would have been easy to kill all interest by a vague and rambling arrangement, but the author begins with a general description, and then concentrates upon the City proper as a preliminary to dealing in turn with each of the modern boroughs. This will not only make the completed work valuable for reference, but is calculated to meet the desires of purchasers in each of the metropolitan divisions. Finally, Mr. Ford Madox Hueffer will contribute a chapter on the future of London. We hope he will not prove a Jeremiah. Those of our readers who are lucky (or unlucky) enough to live out of London will find the work as full of interest as others who dwell under the benign guidance of the London County Council and the metropolitan mayors.

TWO EXCELLENT MANUALS.

Geometry of the Conic. By G. H. Bryan and R. H. Pinkerton. (Dent and Co.)

We have already noted in this issue the paper by Professor Bryan on the neglect of mathematical teaching, and we have opportunely to hand from Messrs. Dent and Co. a copy of the above work, in which Professor Bryan, in conjunction with Mr. Pinkerton, endeavours to put his principles into practice. We may say at once that the book is excellent, refreshing in its treatment of an interesting branch of mathematics. Formerly the custom was to treat each conic section quite independently, but the authors unify the subject by grouping together analogous properties of the three species of the curve and emphasising the fact that a parabola has a centre and one focus at infinity.

The ground covered by the book—namely, the analogous properties of the parabola, ellipse, and hyperbola—makes it especially suitable for the fourth-year course in the secondary school. A further chapter has been added dealing with the catenary, the cycloid, the logarithmic curve, and such curves as are likely to be met with in applied mathematics and engineering work.

For our own part, we should have liked to have seen even more direct application to physical work in the book. We strongly advocate the continual application of the results of pure mathematics to the further science work of the school. An interesting and sensible innovation is the short summary at the head of each chapter, giving its contents. We should like to have a text-book on the calculus on the same lines as this work from the same authors.

Cartesian Plane Geometry. Part I.: Analytical Conics. By Charlotte A. Scott, D.Sc. Price 5s. (Dent and Co.)

This is the third volume in the excellent series of mathematical text-books published by Messrs. Dent and Co. The book takes pretty fully the straight line and the simpler conics, treating them from the algebraic standpoint. A distinctive feature is the systematic use of Cartesian line co-ordinates concurrently with point co-ordinates.

The examples are numerous and well graduated. Altogether Dr. Scott has produced a book which, in conjunction with the book on geometrical conics noticed above, should be of the utmost use in the upper forms of the secondary school.

NEXT MONTH

The Editor of the *Practical Teacher* hopes to present a handy

GUIDE TO THE CHRISTMAS BOOKSHOP,

dealing with the best Gift Books of the season.

French Prize Competition.

1. All French translations **must be received not later than November 6, 1908**, and addressed to:—PRIZE EDITOR, Office of *The Practical Teacher*, 35 and 36 Paternoster Row, London, E.C.
2. Competitors should cut out and send the *coupon* which appears on the Back Wrapper page of the current number. One coupon must be sent for each entry.
3. Competitors should write pseudonym only on MS. Prize-winner will be asked to send name and address for publication.
4. No competitor may take the prize offered more than once in three months.

A Prize of **Half a Guinea** is offered for the best rendering into English of the following extract:—

Nous avons mis longtemps un assez sot orgueil à nous croire des êtres miraculeux, uniques et merveilleusement fortuits, probablement tombés d'un autre monde, sans attaches certaines avec le reste de la vie, et en tout cas, doués d'une faculté insolite, incomparable, monstrueuse. Il est bien préférable de n'être point si prodigieux, car nous avons appris que les prodiges ne tardent pas à disparaître dans l'évolution normale de la nature. Il est bien plus consolant d'observer que nous suivons la même route que l'âme de ce grand monde, que nous avons mêmes idées, mêmes espérances, mêmes épreuves, et presque—n'était notre rêve spécifique de justice et de pitié—mêmes sentiments. Il est bien plus tranquillisant de s'assurer que nous employons, pour améliorer notre sort, pour utiliser les forces, les occasions, les lois de la matière, des moyens exactement pareils à ceux dont elle use pour éclairer et ordonner ses régions insoumises et inconscientes; qu'il n'y en a pas d'autres, que nous sommes dans la vérité, que nous sommes bien à notre place et chez nous dans cet univers pétri de substances inconnues, mais dont la pensée est non pas impénétrable et hostile, mais analogue ou conforme à la nôtre. Si la nature savait tout, si elle ne se trompait pas, si partout, en toutes ses entreprises, elle se montrait d'emblée parfaite et infaillible, si elle révélait en toutes choses une intelligence incommensurablement supérieure à la nôtre, c'est alors qu'il y aurait lieu de craindre et de perdre courage.

From "L'intelligence des Fleurs," by MAURICE MAETERLINCK.

RESULT OF THE OCTOBER COMPETITION.

The prize is awarded to "Excelsior." (Will "Excelsior" kindly forward name and address for publication?)

First Class.—Un aune, Shakspere, Syram, Espérance, Adamant, J. H. L., Pandora, T. V. D., Box, Madge, Mavis, Fleurange, Jan, E. S., Aroer, Mayde Margaret, Heraclitus, Banquo, Treize, Green, Ireen Dhuw, Damocles, Signorinetta, Nannie, Der Ratteufänger, Epigene, Chelt, Perdita, Scixio.

Second Class.—Typhus, Plas. Bras., Sylvesta, St. Dié, Phyllis, Ellan Vannin, Sweet Pea, Philomena, Tawny.

Sent up last month's paper.—Wrecun.

The name and address of "Myosotis," the winner of last month's competition, are Miss Emma Morrogh, Ursuline Convent, Waterford.

REPORT.

Many candidates did not read the extract in an appreciative spirit, and consequently produced translations which rendered the words, but not the feelings, of the original. The piece presented very few difficulties of construction or vocabulary. The main point was to preserve in the English version as much as possible of the beauty of phrase of the original. Will candidates kindly notice that their translations must now be received by the 6th of the month, and not the 8th, as heretofore?

PRIZE TRANSLATION.

Ah, you cannot imagine how comforting it is to be speaking to you this evening. It feels as if a sweet breath meets me when I come near you, and a sensation of repose comes over me; and like a mud-stained garment falling from me, I forget all the disillusions, all the bruises of life's struggles, all the smarts and wounds of rough treatment, all the unpleasant impressions, all the coarseness experienced. It feels as if I were entering a chapel with the childlike belief that the Madonna is smiling on me. I told you, did I not, that I had named you St. Marie des Fleurs, even before knowing you? Do you like being the confidant, to whom, under this title, I bring my confessions and almost my prayers at the end of each day? With so many harsh affronts encountered in my daily life, ranging from brutal frankness to mere want of tact, my progress is painful from beginning to end, and nearly all those I meet irritate me like those stones against which I cannot bear to rub my hand. As persons without this coarse exterior appear to be so rare, I am led to seek them all the more, and after so much testing with the hands how delightful at length to find some that are smooth.

"EXCELSIOR."

NOTES FROM AFAR.

PLAYGROUNDS.

THERE is in America at the present moment a great wave of activity regarding playgrounds. Associations have been formed not only to force the supply of recreation grounds, but to ensure their use. Special organisers are employed to supervise them and to organise games and physical exercises, especially in the large towns. In this respect the states of New York and Massachusetts have been very active and prominent, and it was to this movement Mrs. Humphry Ward referred at the Moral Education Congress. How the movement grows can be seen from the note in the American *Journal of Education* that Indianapolis, in the Middle West, has appointed no less than eight special organisers of playground games, who had charge of 1,200 children during the holidays.

CONFUSION.

BLUNDERS never cease. The same *Journal of Education* records that in the home of Christian Science, Boston, a father was consulting the head of the high school on his son's studies. Looking over the list of subjects, he remarked: "That seems to be all right except the physics. You know I am a Christian Scientist, and am not particularly interested in that subject." The confusion is evident, but what sort of notion of physiology could induce a juror at a London hospital inquest to confide to the coroner: "I think we have far too many organs in our bodies—they only worry us!"?

A Text-Book of Physics. Vol. III. "Heat." By J. H. Poynting, D.Sc., and J. J. Thomson, F.R.S. 15s. (Griffin and Co.)

We have received a copy of the third edition of the volume on "Heat" in the series of physical text-books by the above authors.

The high level of excellent scholarship which marks the two previous volumes on "The Properties of Matter" and "Sound" is maintained in the present volume, while the fact that it has reached its third edition shows that its excellence is appreciated.

The authors have not overburdened the text with advanced mathematical methods, while the prominence given to experiment is an encouragement to the student, and likely to foster the spirit of original research. In the chapter on circulation and convection the subject is treated rather more fully than usual, and well illustrated by reference to meteorology and ventilation. By far the best feature of the book, however, is the clear, concise, up-to-date treatment of the principles of thermodynamics.

The utility of the book is considerably enhanced by the admirable diagrams, clear printing, and wide margins which Messrs. Griffin and Co. have given us.

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STUDIES MOST SUITABLE FOR ELEMENTARY SCHOOLS.

(*Continued from page 180.*)

IN the lower standards the degenerate "object-lesson," which more often than not amounts to little more than a didactic information lesson, should give place to *real* study and observation of plant life and the more obvious natural phenomena. Before any detailed study of the conditions of plant growth can be attempted with success a systematic experimental study of the simplest physical and chemical changes is necessary.

If science teaching is to achieve its full effect in training the reasoning powers and in forming accurate habits, it must involve the experimental solution of problems. As an instrument for exemplifying the experimental method of inquiry, physical science has many obvious advantages beyond those offered by a study of biological subjects. A study of such simple physical subjects as the nature of air, the effects of heat on matter, fluid pressure, the composition of the atmosphere and the effect of plant and animal life upon it, would seem to be fundamental to any intelligent study of plant growth, and should certainly precede it. In the study of plant life the conditions of experiment are so complex that the experimental method of inquiry can only be followed to a very limited extent in elementary schools.

The enthusiastic teacher who has made nature study his hobby will rise superior to syllabuses and programmes, and should be given a free hand. The average teacher, however, finds a carefully drawn up and detailed syllabus of work helpful. For such teachers it is difficult at present to provide a scheme of biological studies that will ensure regular and progressive instruction. In physical science the difficulty of preparing graduated syllabuses is not so great. Some suggestions for experimental courses in different types of elementary schools are appended to this Report.

In deciding what practical work of an exact kind is most suitable for individual pupils in the upper standards of an elementary school we feel that by skilful teaching of experimental science better training may be given than by the conventional methods of nature study, and that it is more easy to obtain a supply of competent teachers in the former than in the latter branch. Further, that much will be lost if the pupil leave the primary school without a knowledge of those fundamental facts necessary to the intelligent understanding of the common phenomena of daily life; he should at least be equipped with that substratum of knowledge of physical science which is necessary to the continued study of any branch of science, whether technical, agricultural, or domestic.

The "Suggestions" of the Board of Education in reference to instruction in elementary physical science appear to be meagre and inadequate when contrasted with those in reference to nature study; the scheme of work outlined by the Board is similar in subject-matter and scope to that suggested in the Reports of the Committee of Section B referred to above. The large amount of experience which has been gained during the past fifteen years in the working of this scheme indicates that it would be undesirable to effect many radical changes in it. The subject-matter included can be adequately taught during the last four years of the school curriculum, assuming that the first year's work is undertaken by pupils between the ages of eleven and twelve.

Training of Teachers.

It is of little avail to advocate the teaching of a method or subject unless an adequate supply of teachers fully competent to handle the subject can be trained. A training in the methods of experimental physical science, although not easy, has already been undertaken with some degree of success in many parts of the kingdom; but, with a few brilliant exceptions, comparatively little has been achieved in the training of teachers competent to direct nature study. Such training presupposes a knowledge of experimental method and a taste for and considerable knowledge of natural history. Under existing conditions it is easier to train teachers of physical science than it is to secure teachers competent to deal with the complex issues involved in the study of living objects.

Until recently, the training in science that teachers have received has done very little to equip them for their work in schools, and it is cause for congratulation that improvement is taking place in the character of the instruction given in the training colleges. It is not sufficient that the teacher should leave the college with a schoolboy's knowledge of science. However little he knows, he must have a teaching grasp of that little, and have fully realised the aims and ideals to be kept before him. Instruction in the training colleges should keep the teaching idea continually in the minds of the students. The tendency to teach specific subjects of science in the training college should be discouraged. This is the function of the university or technical school; the business of the training college is primarily to show the future teacher the methods of his work. It is essential that students entering the training college should be fully familiar with the subject-matter of introductory courses in physical science. This condition is fulfilled where a student has attended a pupil teachers' centre or a secondary school. A large bulk of first-rate teaching material is to be found, however, in the existing teachers who have been engaged at their professional work for several years, but have had no opportunity of being trained in scientific method. For these some provision must be made, and there is ample experience to show that short practical courses under competent instructors have excellent and lasting effects. To conduct such classes of teachers, it is necessary to secure instructors of special experience: they must have superadded to a good knowledge of science a very considerable teaching experience, and should be familiar with the conditions of work in the schools concerned. For such classes sufficient apparatus must be provided, if possible, to enable the teachers to work independently. The chief purpose would be to illustrate the methods of instruction, and to inculcate the proper attitude of mind in the teacher.

The course would be best divided into two parts, each of not less than a hundred hours, of laboratory instruction. Experience shows that students who have attended special classes or training colleges often fail to obtain a sufficient grip of the subject to enable them to teach effectively after the first course of lessons. A second revision course is of great value to these, especially if the teacher in the meantime makes an honest attempt to teach the subject in school.

Organisation of Practical Work in the School.

Where the school is provided with a laboratory, it is desirable that one teacher should be responsible for its care and for the instruction that is given within

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it. If it is necessary to employ a second science teacher, he should act as an assistant to the responsible science teacher. A balance and other apparatus should be provided, if possible, for every two pupils in the laboratory. In designing a science workroom, it is neither necessary nor desirable to provide elaborate furniture. Strong tables fitted, if possible, with gas and plenty of floor space are all that is really needed. A separate lecture-room is unnecessary, but a demonstration table and a few forms should be placed in the laboratory. It is undesirable to provide storage accommodation for individual pupils; cupboards under the tables should be designed for the purpose of general storage. There should be no shelving on the tables, and two or three large sinks on the walls of the room are all that would be required.

In comparatively few cases, however, has the primary school a special room for the teaching of experimental science at its disposal; but in the majority of cases, where no such room or equipment is available, the individual practical work of the pupils cannot be carried out simultaneously. The few simple pieces of apparatus necessary for the leading experiment or experiments of the week's work should be kept upon a table in the classroom, or upon a narrow shelf hinged to the wall throughout the day, and pupils should be sent out singly or in pairs from time to time at the discretion of the teacher during any periods in which no class instruction is taking place, to repeat experiments which have already been carefully performed before the whole class, and thoroughly explained. An equipment of value about £10, in addition to a good strong table and storage accommodation, will enable a very considerable amount of practical work to be accomplished.

The minimum time necessary is one and a half to two hours per week, exclusive of the time devoted to the writing of notes, which may form a considerable part of the teaching of English composition in the school.

The teacher's demonstration lesson, in which he breaks new ground, should be of about one hour's duration. In this lesson, having led his class to an appreciation of the problem to be solved, and having obtained from its members suggestions as to the mode of solution, the experiment will be performed, possibly with the assistance of some of the pupils; the results will be recorded; and between this and the revision lesson later in the week, or even in the following week, the experiment, if suitable, will be repeated by the pupils working in pairs at odd times during the progress of other lessons. There are many suitable periods for such work, and the ten or twenty minutes that a pupil keenly interested may spend at an accurate experiment will not be wasted, nor will an appreciable interruption of other studies occur. Much successful work has been accomplished by this plan; but, like any other kind of teaching, to be effective, it requires an enthusiastic teacher, who will take the trouble to organise it regularly.

In any school where the discipline is sound such individual work causes no interruption after the novelty of the first few lessons has worn off. All the experimental results obtained should be recorded and tabulated in a log book, in which the teacher also enters his results obtained at the demonstration lesson. No conclusions or generalisations should be drawn until a number of pupils have repeated the experiment and recorded the results. The teacher should then make these results the basis of his next lesson, endeavouring to trace the reason for the want of agreement of any particular result with the rest. Conclusions should then be drawn, as far as possible, by the class, and the whole piece of work reviewed, and suggestions made as to the method of writing an account of the work which has been done. It is necessary at first for the teacher to summarise on the blackboard the various points in order with which the composition should deal, but anything in the way of dictation or transcription is valueless. The compositions must represent the children's thoughts in their own words. The experiments which the pupils repeat individually should, as a rule, be those that yield a definite quantitative result; there is little to be gained by repeating individually merely qualitative effects.

Preparation of Lessons.

In a subject in which the methods of instruction are of greater importance than the intrinsic value of the information conveyed, the preparation of careful teaching notes is an essential element in success. It is impossible that science teaching can be fully effective unless careful consideration of every lesson is given beforehand. As year by year the teacher acquires increased experience, the amount of time that he will find it necessary to devote to the preparation of his lessons will diminish, but the more skilful he becomes the more will he appreciate the necessity for thought in his teaching. In the preparation of lessons he must consider carefully how he is to lead from what has been learned already to the subject-matter of the new lesson. Before suggesting any experiment he must make it absolutely clear why it is to be performed; the problem to be solved should be kept prominently in the minds of the pupils throughout the lesson. He must further consider all the difficulties the pupils are likely to meet in acquiring new ideas, and, finally, lay considerable emphasis upon the application of the results of the lesson to daily experience. But notes of lessons are not popular with teachers. The reason is not far to seek. In training colleges students often have been taught to write highly elaborate and highly artificial notes upon extremely simple subject-matter. The only useful notes are those which will help the teacher in his teaching; a few short sentences will usually be sufficient to indicate the train of ideas he intends to follow. Elaborate columns of heads, matter, and method have probably done at least as much harm as good.

In our General Report last year the following reference was made to the special importance of the teaching of experimental method in girls' schools:—

"The science lessons to be given in connection with the subject should have for their main object the inculcation of habits of accuracy and cleanliness. The importance of exact method, and of using vessels which are scrupulously clean, may best be illustrated by the simplest chemical manipulation, and the school should be furnished with a room—not necessarily a laboratory in the sense in which that term is generally employed—in which easy experiments may be performed by the children themselves. As lessons in cooking cannot be given usefully until the child has acquired some manipulative skill, and has reached the higher standards, it is better that the course of experimental science should precede the practical teaching of that subject. It is a matter for consideration whether the science lessons should be combined with the teaching of cooking, illustrating as they arise some of its underlying principles, or whether

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they should run parallel with the instruction or should precede the practical teaching of the subject. Something may be said for each of these plans, but the balance of advantage is in favour of the last, attention being directed to the results of the scientific experiments with which the child would be previously familiar in explanation of cooking processes.

"The selection of subjects for the science lessons and the arrangement of experiments to be performed by the children themselves demand much thought on the part of the teacher, and should not be undertaken without careful preparation. They should be such as would find full illustration in the practical teaching, not only of cooking, but of housewifery and general hygiene."

There can be little doubt that at present boys exhibit more initiative than girls in the general work of the standards; girls appear to be more prone to work by rule of thumb. Without attempting to discuss the reasons for this characteristic, the fact remains that domestic duties call for more initiative, more executive ability, more power of organisation, and more common sense, than do the ordinary vocations that boys follow on leaving school. The woman in the home is continually confronted with new problems, the solution of which demands trained intelligence and a habit of thought. A training in the methods of experimental inquiry would appear to be the most direct means of creating the thinking habit, and if the subject-matter of inquiry chiefly relate to the phenomena and materials of home life such teaching should do much to render more rational the management of the home. Experiments made during the past three years in two large schools in Dublin and Belfast, in each of which five hundred boys and girls have been taught by the same instructor, tend to show no material difference between boys and girls in reasoning or manipulative ability after the first arithmetical difficulties have been overcome: we believe that the reforms in the teaching of arithmetic suggested in our last Report, accompanied by accurate experimenting, would do much to abolish the love of rules and recipes so often noticed in the higher classes of girls' schools. There is little reason to advocate different courses of instruction for boys' and girls' schools; the explanation of the common phenomena of daily life are of equal importance to both, although it may be advisable to consider popular prejudice and make the boys' programme look a little less domestic than that of the girls.

The character of the instruction in both boys' and girls' schools requires to be far less academic than heretofore; there must be more deliberate purpose of training to think and reason in terms of everyday life. A lesson without some application to common experience should, in the primary school, be regarded with suspicion.

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THE HERBARTIAN PSYCHOLOGY APPLIED TO EDUCATION.*

BY W. MACPHERSON, M.A.

(*Continued from page 218.*)

II.

Some Practical Applications of Herbartianism.

THE central feature of the Herbartian psychology, as was explained in last month's article, is the theory of apperception, which affirms that any new knowledge that is presented to the mind must be brought into relation with, and is interpreted and modified in the light of, the apperception masses already in the mind. In order that ideas may be assimilated and understood by a pupil, he must have the power of bringing to bear upon them the appropriate apperception masses; he must group the new ideas round some common centre, in relation to which each idea will fall into its proper place and will thereby acquire meaning.

Professor Adams, in the course of his illustrative remarks throughout the book, suggests various exercises which are especially suitable for the training and development of this fundamental power.

In Chapter IX. a plea is advanced for the use of "graphic hypotheses" in teaching. By this Professor Adams means the drawing of maps and diagrams for the purpose of illustrating and explaining a group of facts. It should be noticed that the indiscriminate drawing of maps and diagrams is not advocated, but, on the contrary, condemned. There are cases in which a drawing hampers instead of aiding thought. "Certain ideas are better left in words, inasmuch as they do not lend themselves to representation in terms of extension." Frequently, however, in literary teaching, drawings are useful as a means of expressing and defining more exactly an author's meaning. Thus the construction of a map to illustrate Robinson Crusoe's island would enable the reader to follow Defoe's narrative more clearly, and therefore to enjoy it more. Furthermore, the process involved in the making of such a map is essentially a training of the apperception masses, and it is here that the advocacy of "graphic hypotheses" is seen to be in harmony with Herbartian ideas. The making of a map or diagram which is to be of any use as a means of illustrating and explaining a group of facts necessarily implies three processes—collecting the facts, collating them and forming an explanatory hypothesis, and reproducing the facts according to this hypothesis. The second of these processes is simply, in Herbartian terms, the process of apperception; and thus such exercises must, from a Herbartian point of view, be considered to be valuable as a means of mental training. The term "graphic *hypotheses*" should be noted as expressing aptly the quality which imparts to these exercises their chief educational value. Other exercises which are fitted to develop the power of arranging ideas in a consistent system are translation and paraphrasing. Just as it is impossible to draw a good illustrative diagram apart from some guiding idea or theory, so it is impossible for a pupil to write a good paraphrase unless he has formed a hypothesis, a general idea of the meaning, in the light of which the significance and connection of the successive parts

* *The Herbartian Psychology applied to Education.* Being a series of essays applying the Psychology of Johann Friedrich Herbart. By John Adams, M.A., B.Sc. Set for the Certificate Examination of December 1908.

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of the passage become plain. "Every paraphrase or translation worthy of the name is based upon a hypothesis as to the system of ideas involved." The same remark, indeed, may be applied generally to the reading of literature with understanding. "Many people object to Browning's poetry, and say they do not understand it. What they really want is an intimation, at the head of each poem, of the system or mass under which the poem is to be apperceived. Frequently one fails to appreciate a poem because one does not understand the tone in which it is written." Again, the process of relating ideas to apperception masses is involved in the power of appreciating a joke. The essence of a joke consists in the suggested relation of an idea to an inappropriate system or mass: before we can perceive the incongruity involved we must have two apperception masses at our command, to each of which we can relate the idea in question. Thus before we can appreciate the joke perpetrated by the pupil who explained the phrase "funeral note," in "The Burial of Sir John Moore," as meaning "the letter inviting somebody to the funeral," we must be able to fit the idea of a "note" into two masses—the *letter mass* and the *musical mass*. In a characteristic chapter, entitled "A Neglected Educational Organon," Professor Adams points out that for the reasons stated the power to understand a joke may be taken as a criterion of a pupil's intellectual progress.

Herbartianism and the School Curriculum.

The notion is sometimes formulated that it is of little importance what subjects are included in the school curriculum. The mind, it is said, may be trained by the study of any subject: it is not the matter, but the manner, of instruction that is of consequence. If this were true, the discussion regarding the relative value of subjects of instruction, which of late years has so engaged the attention of writers on education, would have to be condemned as being visionary and useless. The Herbartian psychology, however, goes to discredit the notion that the choice of subjects for the curriculum is, comparatively speaking, unimportant. According to Herbart, as we have seen, education consists mainly in the modification of old apperception masses and the formation of new ones. Now, each individual subject of instruction is fitted to form its own peculiar and characteristic apperception masses. It is governed by its own technique, its own basic ideas and points of view, which are different from those of any other subject. When an expert reads a book bearing on the subject he has made his own, he readily brings the author's ideas into relation with the right apperception masses. He submits them unconsciously to the technique in which he has been trained, and judges them by it, and the place which they will hold in his consciousness depends on this process. A person ignorant of the terminology and ideas of metaphysics could not apperceive the ideas expressed in Kant's *Critique of Pure Reason*. Each subject, indeed, is fitted to produce a special type of mind, and we realise this when we speak of the mathematical mind, the philosophical mind, the scientific mind. It is thus seen that "formal education" (which is the term Professor Adams uses to express the training of the mind irrespective of the materials upon which it is exercised) is an illusion and an impossibility: it is desirable and necessary that we should consider carefully what subjects are to be included in the school curriculum. With the question as to which subjects precisely are the most suitable we are not here concerned, but at least the curriculum should be wide enough to produce a fairly comprehensive development. The training should not be exclusively in one or two special kinds of ideas and modes of thinking: it should be such a training as will be likely to lead to the development of the pupil's self as a whole, in the essential possibilities of its nature; it should seek to "correlate the child with the civilisation into which he is born." It is interesting to note that this conclusion which has been reached brings the ideas of Herbart into relation with those of Froebel and the "school of idealism," and it is on this suggestive note that Professor Adams closes: "This outcome of his work would no doubt have greatly surprised Johann Friedrich Herbart. But if we have drifted somewhat from Herbart, we have drawn nearer to Froebel. That the two opposing systems should tend to meet on common ground is no more than one acquainted with the movement of the Hegelian dialectic would expect. It might be interesting, and it would not be excessively difficult, to resolve the antagonism of the two systems."

A NEW ANALYTICAL GEOMETRY.

This book* has been prepared to form a companion volume to Dr. Askwith's *Course of Pure Geometry*, and the references to this are frequent in the latter portion of the present work. The author covers a wide range. His programme includes not only the usual elementary work, but also chapters on areal co-ordinates, tangential equations, invariants, and covariants. We can recommend the volume to the more advanced student, and our criticisms are subordinate to this recommendation.

The first 250 pages deal with the straight line, the circle, and the sections of a cone. There are some variations from the usual order and methods of treatment. The general equation of the second degree is partially discussed immediately after the circle. This plan has its advantages. For instance, the equation of the tangent is found, which saves repetition in the special cases. The diagram in this chapter is somewhat misleading, the section of the cone labelled hyperbola being drawn parallel to the axis of the cone. In the succeeding chapters unicursal co-ordinates are used freely. This is advisable, but their use must be introduced in a very convincing manner if the young student is not to regard the method as merely a pretty dodge. It is necessary to prove thoroughly not only that a point, but that every point on the curve can be so represented; and further, that all points so represented *are on the curve*. The co-ordinates $(a\cos\theta, b\sin\theta)$ can be used for any point on the ellipse, because the greatest abscissa is a, and the greatest ordinate b; $(a\cos^3\theta, a\sin^3\theta)$ are unsuitable for the curve $x^{\frac{2}{3}}+y^{\frac{2}{3}}=a^{\frac{2}{3}}$, although this point lies on the curve.

The work on the general conic follows the usual lines. For example, to find the lengths of the semi-axes, the general equation is reduced to the form $ax^2+2hxy+by^2=1$. For this purpose the value of $\frac{\Delta}{C}$ is calculated. It would surely, then, be better to find the lengths from $\left(a+\frac{\Delta}{C^2}\right)\left(b+\frac{\Delta}{C^2}\right)=h^2$, without this arbitrary reduction.

Drawing conics whose equations are given is very shortly considered. It is important work for the beginner.

This half of the book covers the usual school work. The examples are on the hard side, and there are too few of them. Rather too much space is given to such little-used work as metrical results for oblique co-ordinates. On the other hand, the book-work is clearly expressed and beautifully printed.

In the second half, one chapter deals with areal co-ordinates. These the author considers the simplest system of homogeneous co-ordinates. He dismisses "so-called trilinears" in a page. We doubt the wisdom of this innovation. The young student necessarily finds a length less abstract than the ratio of two areas.

Tangential equations are discussed relative to the Cartesian equation, and subsequently tangential co-ordinates are defined. This order would be better reversed. If tangential methods are to be intelligently used, they must have an independent treatment.

* *The Analytical Geometry of the Conic Sections.* By the Rev. E. H. Askwith. 443 pages. Adam and Charles Black.

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JOHN WILLIAM ADAMSON, B.A.,

Professor of Education in King's College, London; Examiner in Education to the Universities of London, Durham, and Liverpool, and to the College of Preceptors.

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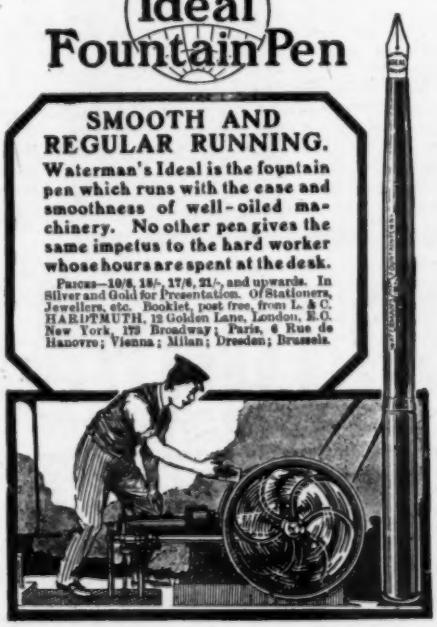

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English.

OF all the writings of Washington Irving, perhaps the one that is most interesting to students of English literature is his biography of Oliver Goldsmith. Irving's style closely resembles that of Goldsmith, and he acknowledges Goldsmith as his literary master. On this account students of Goldsmith's works should read what Irving has to say about him. We must content ourselves with the following brief notice.

Oliver Goldsmith was born on November 10, 1728, in the quiet little village of Pallas, or Pallasmore, in County Longford, in the middle of Ireland. His father was the Protestant clergyman of the parish, and is the man who, "passing rich with forty pounds a year," has been immortalised by his son in *The Deserted Village*. The poet received his early education from a variety of people and in face of many difficulties. Dr. Johnson says of him: "He was a plant that flowered late; there was nothing remarkable about him when young." He, however, always preserved a grateful recollection of "Paddy Byrne," the master who taught him at Lissoy, and who is carefully described in *The Deserted Village*. "A man severe he was, and stern to view," but "many a joke had he;" and he seems to have fostered his young pupil's sense of humour, and to have encouraged his early attempts at versification. At the age of nine Goldsmith had a bad attack of small-pox, which disfigured him for life. At the age of seventeen he entered Trinity College, Dublin, as a sizar—that is, as a poor scholar who, in return for his board and instruction, was obliged to act as a kind of college servant. He was always short of money, and was frequently getting into trouble with the college authorities. On one occasion his tutor thrashed him for a breach of college rules, and next day Goldsmith ran away, sold his books and spare clothes, and when he had spent all but a shilling of the money thus raised, he left Dublin, intending to walk to Cork and cross over to America. He lived on that shilling for three days, and then he decided to go home to his eldest brother, Henry, his father having died shortly before. Through his brother's influence Oliver was readmitted to college; but he was not a creditable student, and only just managed to secure the last place on the list of those who took their degree in 1749. After a few years spent in a roving life, he was sent to Edinburgh to study medicine. He seems to have worked better there than elsewhere; but after a time he left Edinburgh and went to Leyden. There he heard of Holberg, who had travelled over Europe, journeying by day, singing at peasants' houses for lodging at night. He had been rewarded by the King of Denmark for his services to literature, and Goldsmith determined to follow his example. He left Leyden in February 1755, and worked his way through Louvain, Antwerp, Brussels, and other towns in Belgium. He then went through France to Paris, where he met Voltaire. After that he went through Switzerland, visiting Basle, Geneva, and Berne; and then, crossing the Alps, he went to Florence, Milan, Venice, and other towns in Italy. He then returned through Paris after a tour of two years, and passing through Dover, tramped his way to London, where he took up his abode.

The first few years of his stay in London were passed in great poverty. He managed to get a bare living by acting as usher in a private school and by doing literary hack-work, but in 1759 he published a little book entitled *An Inquiry into the State of Polite Learning in Europe*. This brought him into notice, secured him some literary work in magazines, and led to his acquaintance with some of the more prominent literary men of the day. He was engaged to contribute articles to a paper called the *Daily Ledger*. These articles have been collected into what is known as *The Citizen of the World*. Among the friends Goldsmith made about this time we must mention (Dr.) Johnson, Smollett, (Bishop) Percy, and (Sir) Joshua Reynolds. Of these, Johnson on more than one occasion proved a real friend and a help in time of need. Thus at a critical moment he is said to have obtained for Goldsmith the payment of £60 for the manuscript of *The Vicar of Wakefield*. Shortly after this Goldsmith produced *The Traveller*. English poetry was then at a very low ebb, and the poem established quite a reputation for Goldsmith. It also introduced him to those who would have been rich and influential patrons, but Goldsmith declined to ask their assistance.

Feeling the necessity of writing again, Goldsmith produced his comedy of *The Good-natured Man*. Through the introduction of Sir Joshua Reynolds this was submitted to David Garrick, who was managing Drury Lane Theatre. Garrick did not think it in keeping with the public taste, and it was passed on to Colman at Covent Garden. The great success which it achieved showed how ill-founded had been the hesitation of the two managers. After writing a certain amount of hack-work, Goldsmith produced *The Deserted Village* in 1770. This brought him one hundred guineas, and became extremely popular. Three years later he produced *She Stoops to Conquer*, which was an immediate success, and has always been regarded as the work of a genius in comedy.

Goldsmith died on April 4, 1774, and was buried in the churchyard of the Temple Church, where his grave may still be seen. A monument was erected to him two years afterwards in Westminster Abbey, and Dr. Johnson wrote the inscription for it in Latin.

The comedy, *She Stoops to Conquer*, not only took the town by storm when first produced, but is frequently put on the stage now, and provokes roars of laughter. There is something very real about the character, and the plot itself is based on an incident in Goldsmith's early life, when he mistook a gentleman's house for an inn. The character of Tony Lumpkin, the spoilt boy who becomes a country lout, owes a great deal more to Goldsmith's memory than to his imagination. The whole play abounds in true humour, and every character is well drawn, from Tony Lumpkin to Diggory, who always bursts with laughter at his master's jokes. The situations are most amusing, particularly when Hardcastle is treated as an innkeeper in his own house, and when Mrs. Hardcastle is deceived by Tony.

One of the minor English prose writers is James Boswell, whose *Life of Dr. Johnson* will always be regarded as a standard work. He was born in Edinburgh in 1740, and studied law both at the Scottish universities and on the Continent. His desire to be introduced to great men seemed to be almost a mania, and it was satisfied by an introduction to Dr. Johnson, who seemed to take a great fancy to the young man. Boswell kept in Johnson's company as much as possible, and noted pretty well every remark and conversation that he heard. The biography was published in 1790, five years after Johnson's death, and to it we owe a great deal of information, not only about Johnson himself, but also concerning Goldsmith, Reynolds, and the other great men of the time with whom Johnson associated. In 1773 Boswell accompanied Dr. Johnson on a tour in the Hebrides, and the journal of this visit is the interesting book which is named in the syllabus.

Another English prose writer whose fame may be said to hang upon one book is Gilbert White. He was born in the village of Selborne in Hampshire, near the borders of Surrey and Sussex, and after an education at Oriel College, Oxford, was ordained, and became curate of his native village in 1751. He was a very acute observer, and wrote with a charming simplicity. The passage in which he compares the flights of different birds illustrates both these points; and even a person who takes no interest in natural history will be as much fascinated with *The Natural History of Selborne* as he would be with a great many novels. The book is written in the form of letters to Pennant, the great zoologist, and to Sir Daines Barrington, an eminent lawyer, naturalist, and antiquary. In view of the importance which nature study now plays in elementary education, we strongly recommend all students to make themselves thoroughly acquainted with Gilbert White's *Natural History of Selborne*.

It often happens that modern writers are known by their works alone, and the student who could write a fine biography of Shakespeare or Milton is absolutely ignorant of the personal history of Dickens or Tennyson. It is hoped that the following sketch will not only be interesting in itself, but will add to the interest with which the works of Dickens will be read.

Charles Dickens was born at Landport, a part of Portsmouth, on February 7, 1812, his father being then a clerk in the Navy Pay Office at Portsmouth Dockyard. Two years later the family came to London, and in 1816 they settled at Chatham. On one occasion, as he was travelling by road from Chatham to London with his father, he was struck with Gad's Hill Place, and admired it, and his father told him that if he worked hard enough he should have it to live in when he became a man. This prophecy was eventually fulfilled, though not till he had gone through a great amount of hardship in his early life.

When Charles Dickens was ten years old, his father, who had retired on a very small pension, was in pecuniary difficulties, and was put in the Marshalsea Prison for debt. His mother endeavoured to support the family by taking pupils at a house in Gower Street, North, but her plans failed, and she went to join her husband in the Marshalsea. The boy Charles was endeavouring to support himself by working in a blacking shop, lodging during this time in Little College Street with an old lady who is depicted as Mrs. Pipchin in *Dombey and Son*. In order to be nearer his parents he went to lodge in Lant Street, Borough, a street much frequented by medical students, and which is given as the home of Mr. Bob Sawyer in *Pickwick*. Charles frequently visited his parents, and acquired a familiarity with the old prison

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of which he made use in his writings—in fact, he generally had his breakfast and supper within its walls. His parents still retained the services of a maid-of-all-work, whom they had brought from Chatham Workhouse, and who is the original of "the Marchioness" in the *Old Curiosity Shop*. John Dickens managed to clear himself as a bankrupt, and sent his son to school for two years—1824-26. After this Charles Dickens obtained a post as office-boy in an attorney's office. He set himself to study shorthand, and in 1831 was reporter for the *True Sun*, and later on for the *Mirror of Parliament*, a paper run by an uncle of his. In 1834 Dickens became reporter for the *Morning Chronicle*, and began the series of *Sketches by Boz*, some of which appeared in the *Old Monthly*, and others in the *Evening Chronicle*. At the end of two years these were collected and published in one volume, for the copyright of which Dickens received £150. The *Sketches* led Messrs. Chapman and Hall, the publishers, to invite the author to write copy to go with some comic sketches that had been submitted to them. Dickens accepted on the understanding that there should be a certain continuity in what he wrote, and the result was *The Pickwick Papers*. Soon after these papers began to appear, Seymour, the original artist, committed suicide, and amongst the unsuccessful applicants for his work was Thackeray, then an art student; but the artist selected was Hablot K. Browne, who carried on the work under the name "Phiz." This account of the origin of *The Pickwick Papers* will explain the absence of plot in the work, in spite of which it soon obtained great popularity. In 1837 Dickens undertook the editorship of a magazine, *Bentley's Miscellany*; and the next year he wrote *Oliver Twist*, which appeared in this in the serial form, and was illustrated by the humorous drawings of George Cruikshank. In 1840 and 1841 Dickens carried on a weekly paper, *Master Humphrey's Clock*, in which he wrote several short stories, and the *Old Curiosity Shop*, the splendid novel in which he showed the depth of pathos of which he was capable; and *Barnaby Rudge* was produced in the same way. After a visit to America—described by himself in *American Notes*—he planned the production of a Christmas story, and brought out the *Christmas Carol*, on which the printers and publishers spared no pains, and which commanded an extensive sale at five shillings a copy. Following the same lines, he brought out in succession for the next four Christmases, *The Cricket on the Hearth*, *The Chimes*, *The Battle of Life*, and *The Haunted Man*. During the same period he also produced *Martin Chuzzlewit*, *Dombey and Son*, and *David Copperfield*. These first appeared in monthly parts.

In 1845 Dickens helped to establish the *Daily News*, of which he edited the first few numbers. In 1850 he established the weekly magazine known first as *Household Words*, and afterwards as *All the Year Round*. This was published with the avowed object of assisting social reform.

Bleak House, a story in which he exposed the "law's delay," was his next novel, and then *Little Dorrit* appeared—in both cases in the form of monthly numbers. The story recommended in the Certificate syllabus, *The Tale of Two Cities*, was published in 1859 in *All the Year Round*. This was one of the most powerful stories he ever wrote, and it was almost his last. It is true that after this he wrote *The Uncommercial Traveller*, *Great Expectations*, and *Our Mutual Friend*; but he appeared before the public as a lecturer and a reader of scenes from his own books, and so gave less time to writing. After another visit to America he began *Edwin Drood*, but before it was finished he died on June 9, 1870.

The French Revolution was a movement which was attended with such great social changes and excesses that a faithful description of the events connected with it thrills with interest, and it offers opportunities to the novelist which he is denied in dealing with more peaceful times. The character of Sidney Carton is extremely well drawn. We feel pity for the man who throws his chances away and fails to seize his opportunities, but we are unable to pass the censure his failings deserve on account of the high admiration we feel for his noble self-denial. The book has been dramatised, and under the title of *The Only Way* the play has attained a very wide popularity.

Elementary Science.

Notes of a lesson on alimentation.

Preparation.—Recall to the children the subject-matter of previous lessons on respiration, circulation, and the composition of substances of physiological importance, such as carbon dioxide, air, ammonia, starch, and gluten.

Presentation.—We have seen that during the life of an animal heat is produced in the body, and that the tissues, such as the muscles, undergo disintegration and wear away as the result of the performance of their functions. In order to supply material to combine with oxygen and produce heat, and in order to re-form and rebuild the muscles and other tissues, food must be taken. As nitrogen is always found in the muscles and is given off largely in the waste products from them, it is evident that they cannot continue in action for an indefinite time unless nitrogen is supplied in the food. On the other hand, many substances are taken as food which contain no nitrogen, and these were thought to be used merely to maintain the heat of the body. Hence it was customary to speak of foodstuffs as consisting of two great classes—"heat-producers" and "flesh-formers." Modern physiologists, however, have shown that some of the non-nitrogenous matter is used in forming flesh, while the combination of nitrogenous matter with oxygen produces heat. Hence the old classification is being abandoned. The chief classes of foodstuffs now recognised are:—

1. *Proteids*, such as the albumins, found in eggs, muscle, and serum, and the glutens, found in wheat. These form the chief part of the solid matter in meat, fish, milk, and bread.
2. *Carbohydrates*. These are compounds consisting of carbon combined with oxygen and hydrogen, the latter being present in the proportions in which they form water—for example, starch, sugar, and gum.
3. *Fats and Oils*, both animal and vegetable.
4. *Inorganic compounds*, such as water and salts.

No one substance can be used exclusively as food, and most natural foods contain mixtures of the above compound substances, but foods are described as more or less perfect according as they contain the substances required to support life in the proportions most suitable. Eggs may be regarded as a perfect form of food, for they contain all the material, except free oxygen, which is in the air, that is required to build up the body of a complete bird. About eighteen hen's eggs, weighing about two pounds, contain a day's complete nourishment for an adult man. Milk comes next as a complete food. It contains proteid matter in the form of *casein* (which forms the curd in cheese-making), fat in the form of cream globules, carbohydrates in the form of milk sugar. There are also salts, intended to build up the bones of the young animal. There is more nourishment in a quart of milk than in a pound of beefsteak, and it is much cheaper.

The first change that the food undergoes is a mechanical one; it is ground up to a pulp by the teeth, but at the same time it is mixed with the saliva, which exerts a chemical action upon it. The action of the saliva is very important; and as the flow of the saliva is promoted by the act of chewing, we see that there is a danger in taking much food that does not require chewing. A piece of dry stale bread is likely to be better digested than a piece of sop, because the dry bread cannot be swallowed until it has been thoroughly masticated, during which it gets well mixed with saliva; while the sop and soft foods of that type can be swallowed before the saliva can be thoroughly mixed, and hence they pass into the stomach without undergoing the least solution by the saliva. The saliva not only moistens the food and makes it easy to swallow; it helps to dissolve some foodstuffs, such as sugar, while it acts chemically on starch, which is insoluble, and turns it into soluble sugar.

In the stomach the food is brought under the influence of the gastric juice, which contains a ferment called *pepsin*. This ferment has a powerful action on albumin, which it converts into peptones. The latter are not coagulated by heat, and are much more soluble in water than the former. Owing to this process they are readily absorbed by the small vessels which lie in the lining of the stomach. The gastric juice has no action on oils and fats, neither does it affect starch. The movement of the stomach helps to further pulp up the food which has passed into it.

In the intestine the partly digested foodstuff is acted upon by a mixture of bile and pancreatic juice. The action of the bile is not a very direct one, and that of the pancreatic juice is the more important. The latter completes the transformation of albumin and other proteids into peptones; it also has a double action on fats, decomposing some of them into glycerine and fatty acids, and mechanically splitting other fat material into minute globules, forming what is called an emulsion, the particles of which pass through the walls of the intestine and eventually enter the blood. Finally, pancreatic juice acts upon starch and converts it into sugar. Its action is like that of saliva, but much more powerful.

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